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Marine Fisheries Abstracts

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Marine Fisheries Abstracts

UNITED STATES DEPARTMENT OF COMMERCE

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NATIONAL MARINE FISHERIES SERVICE

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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Marine Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Marine Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.39 (1.87) BEHAVIORAL RESPONSES OF MALE LOBSTERS TO ECDYSONES

Atema, Jelle, and Robert B. Gagosian (Woods Hole Oceanographic Institution, Woods Hole, MA 02543)
Marine Behavior and Physiology 2, No. 1, 15-20 (1973)

The female lobster (Homarus americanus) releases a sex pheromone upon molting. This attractant suppresses aggression and induces courtship in the male. In many cases lobsters and other crustaceans mate just after the female molts. This suggested to the authors that the molting hormones of the female could be involved in the pheromone releasing process through a metabolic mechanism. Preliminary work on crabs suggested that the molting hormone β-ecdysone served a dual function and was directly involved as the sex pheromone of the crabs. It was further suggested, in other reports, that β-ecdysone would serve as the common crustacean sex pheromone. Its relationship with the hormone system would serve as an evolutionary model for the development of all arthropod sex pheromones.

In experiments to determine their capacity to provoke behavioral responses, especially sexual responses, in the male lobster, four ecdysones with molting hormone activity were tested: β-ecdysone, inokosterone, ponasterone A, and cyasterone. Of these four preparations, only β-ecdysone elicited a low-key alerting response; however, particular types of behavior such as feeding, aggression, or sexual response were not exhibited by the lobsters. The authors concluded that the results of these experiments indicates that β-ecdysone is not a crustacean

0.4 (9.17)(1.69) (0.5) OBSERVATIONS ON THE USE OF FURANACE FOR CONTROL OF VIBRIO DISEASE IN MARINE FLATFISH

Pearse, L. (Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Port Erin, Isle of Man, United Kingdom), R. S. V. Pullin, D. A. Conroy, and D. McGregor
Aquaculture 3, No. 3, 295-302 (June 1974)

Furanace is the trade name of a new vinylogous nitrofuran derivative which was developed as a chemotherapeutic agent for use with fish. Tests were performed in vitro to determine the minimum inhibition concentrations (MIC) against strains of pathogenic Vibrio anguillarum and a few other strains of Vibrio isolated from marine fish and salmonids. All the strains were sensitive to Furanace; the highest MIC was 3.1 μg/ml for one vibrio strain. All the other strains were sensitive to an MIC of less than 1.6 μg/ml.

Three species of flatfish were immersed in water containing Furanace to determine their uptake rate of the agent. Plaice, Dover sole, and brill (Scophthalmus rhombus) rapidly took up Furanace from water containing low concentrations (5-10 μg/ml) at 9.5°-11.5° C. The uptake varied between species. In most cases blood levels above 1 μg/ml were achieved after 1 hour; two hours later, 70% of the Furanace had been eliminated from the blood. The rate of uptake and excretion of the agent may be related to the body size, gill area, oxygen concentration, metabolism, and respiratory rate. Uptake and elimination of Furanace was more rapid in plaice than in the other fish. In studies of the effects of Furanace on Dover sole and plaice inoculated with Vibrio species, preliminary results

0.4 (1.953) ECHOLOCATION IN ANIMALS

Airapet'yants, E. Sh., and A. I. Konstantinov
Academy of Sciences of the U.S.S.R., Leningrad, U.S.S.R. (1970), vi + 309 pp.
Translated from Russian (1973), available from the National Technical Information Service, U.S. Dept. of Commerce, Springfield, VA 22151. Catalog No. TT-72-50012.

The history of echolocation began in the year 1793 when the Italian scientist Spallanzani (who is famous for producing evidence disproving spontaneous generation) demonstrated that bats fly freely in a dark room in which owls become helpless. A French correspondent of Spallanzani's, Charles Jurine, in 1794 wrote that the bats became helpless when their ears were plugged. The combination of hearing requirements of bats and their apparently soundless flight caused the obvious conclusions of Spallanzani and Jurine to be rejected by their contemporaries, among whom was Georges Cuvier. Spallanzani's works were revived by S. Dijkgraaf [Die Sinnenswelt der Fledermäuse 5, No. 90 (1949a)] and [Vakblad voor Biologen 29, No. 21, 21-24 (1949b)] and D. R. Griffin [Listening in the Dark. The Acoustic Orientation of Bats and Men. Yale Univ. Press, New Haven, 413 (1958)].

The sonic location by organisms was considered to be a characteristic only of bats; however, in 1953 nocturnal birds were discovered to have the faculty also. In 1956 echolocation was discovered in the aquatic environment among the Cetacea. A. F. McBride is credited with the discovery [Evidence for Echolocation by Cetaceans. Deep-Sea Research 3, 153-154 (1956)].

0.4 REPRODUCTION OF MARINE INVERTEBRATES. VOLUME I ACOELOMATE AND PSEUDOCOELOMATE METAZOANS

Giese, Arthur C. (Hopkins Marine Station, Stanford University), John S. Pearse (Div. of Natural Sciences, University of California, Santa Cruz, Calif.) (editors)
Academic Press, Inc., New York (1974), xi + 546 pp.

This book should be of use to students of marine biology, ecology, and reproduction in general. This book is the first of seven volumes. In the first six volumes, specialists will deal with specific marine invertebrate groups. In volume VII, the authors will deal with general aspects of reproductive physiology and ecology.

In the first chapter of volume I, the general principles of reproduction are discussed. In the succeeding chapters the following groups of marine invertebrates are described: Porifera (sponges), Cnidaria (hydrozoa, jellyfish, medusa), Ctenophora (mostly free-swimming, planktonic macroscopic organisms), Platyhelminthes (flatworms, and parasitic flukes and tapeworms), Gnathostomulida (marine worms), Nemertinea (soft oval marine worms), Nematoda (true roundworms and economically important parasites of plants and animals), Rotifera (microscopic wormlike to spherical organisms), Gastrotricha (microscopic wormlike animals), and Kinorhyncha (microscopic wormlike forms living on the sea bottom). Each chapter has a list of references; there are also author, subject, and taxonomic indexes.

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0.4 (1.953)

Twelve chapters in this book are given to echolocation in bats, birds, and small land animals. The subjects covered include: biology, ecology, and behavior of bats; types of signals emitted; mechanisms of ultrasound generation, anatomy of ear and nerve associated with echolocation; and echolocation in birds and land mammals. Six chapters are devoted to echolocation in the sea. A survey of the Cetacea is presented covering baleen and toothed whales, porpoises, dolphins, and the narwhal. The mechanisms of sound generation, the various sounds emitted, their biological significance, the anatomy of auditory perception, and the range of perception are discussed. Echolocation in seals is also described.

A 29-page bibliography of Russian and other language publications is given.

SW

0.5 OCCURRENCE OF POTENTIAL PATHOGENS IN WATER CONTAINING ORNAMENTAL FISHES

Trust, T. J., and K. H. Bartlett (Dept. of Bacteriology and Biochemistry, University of Victoria, Victoria, British Columbia, Canada)
Applied Microbiology 28, No. 1, 35-40 (July 1974)

Qualitative and quantitative bacterial analyses were made of the water supplied with ornamental fish purchased from 13 retail outlets. In addition, water from an aquarium in a local shopping center and from two other aquaria at the University of Victoria was examined. A total of 42 water samples was examined. The results showed as many as 10^9 viable aerobic organisms per 100 ml of water; fecal coliforms counts were as high as 10^5 per 100 ml. Citrobacter, Escherichia, Pseudomonas, and Vibrio were isolated from over 75% of the water samples; Aeromonas, Alcaligenes, Enterobacter, Flavobacterium, and Streptococcus were isolated from 45% to 65% of the water samples. The organisms Pseudomonas aeruginosa, Edwardsiella tarda, and Klebsiella pneumoniae were also isolated. The authors suggest that epidemiological studies of the relationship of bacteria in aquaria with clinical conditions in humans is worthy of study by public health officials. Furthermore, they indicate that the need to establish and enforce regulations similar to those in effect for the control of turtle-borne disease is evident.
[4 tables, 26 references]

FTP

0.4 ACTION OF SMALL CONCENTRATIONS OF ANTISEPTICS ON THE EMBRYONIC DEVELOPMENT OF FISH (9.16)

Stroganov, N. S., and O. P. Dantl'chenko (Mosk. Gos. Univ. im. Lomonosova, Moscow, U.S.S.R.)
Chemical Abstracts 81, No. 3, 10210e (July 22, 1974)

0.39 (1.87)

sex pheromone. In addition, they suggest that it cannot serve this purpose because sex pheromones must be species specific to avoid attracting other species to the site of release. However, there is a possibility that species specific catabolites of ecdysone act as sex pheromones.
[1 figure, 1 table, 9 references]

SW

0.39 EFFECTS OF STORAGE TIME, TEMPERATURE, AND ANTICOAGULANTS ON HARP SEAL, PHOCA GROENLANDICA HEMOGRAMS. SIMULATED FIELD STUDY (1.951)

Gerrach, J. R., and F. R. Engelhardt (Dep. Pathol., Univ. Guelph, Guelph, Ontario, Canada)
Chemical Abstracts 81, No. 1, 1709x (July 8, 1974)

0.4 (9.17)(1.69)(0.5)

indicate that the agent can eliminate the bacteria involved in systemic infections. The fish are immersed in water containing Furanace; recovery is complete provided treatment is started before the fish become grossly anemic.

The authors suggest that Furanace has a potential for use as a therapeutic agent against vibrio infections in fish. Treatment is more effective by immersing the fish in water containing the Furanace for short periods of time than oral administration. The agent is suitable for use in food fishes because it is eliminated rapidly and delays in marketing the fish after treatment would be minimal.
[1 figure, 5 tables, 10 references]

SW

0.4 RED SNOW IN ONTARIO CAUSED BY THE DINOFLAGELLATE, GYMNODINIUM PASCHERI

Gerrath, J. F., and K. H. Nicholls (Dep. Bot. Genet., Univ. Guelph, Guelph, Ontario, Canada)
Chemical Abstracts 81, No. 6, 29385n (Aug. 12, 1974)

0.5 (2.3) MICROBIOLOGICAL MONITORING OF THE FOOD PLANT: METHODS TO ASSESS BACTERIAL CONTAMINATION ON SURFACES

Baldock, J. D. (Dept. of Food Science and Technology, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061)
Journal of Milk and Food Technology 37, No. 7, 361-368 (July 1974)

The detection and enumeration of microorganisms on environmental surfaces is used by the food industry to evaluate the efficiency of cleaning compounds and to assess the sanitary condition of the processing areas. The specific technique used to assay microbiological contamination must be related to the types of organisms expected, the types of surfaces being investigated, and the limitations of the technique. A review of several common techniques is provided in this paper.

Three major sampling techniques are used to assess the level of microbial contamination: (1) contact of the surface by swab or with contact agar plates; (2) collecting the rinsings from a contaminated surface; and (3) a combination of the first two methods. The swab method involves rubbing a moistened sterile cotton swab over the test surface, placing the swab in a dilution bottle, diluting the material on the swab, and plating the dilution on a solid medium. One modification of this method is to substitute calcium alginate for the cotton swab. Ringer's solution or sodium hexametaphosphate dissolves the alginate and frees any entrapped microorganisms; this produces higher counts than with a cotton swab. The rinse method involves agitating a sterile fluid mainly in food containers, utensils, and pipelines. The rinse fluid is then diluted and plated. The agar contact method is used for smooth or semismooth, flat surfaces. The agar surface is pressed in contact with the surface area to be tested, removed, and incubated.

0.6 FUNCTIONALITY OF FISH MUSCLE: EMULSIFICATION CAPACITY

Childs, E. A. (Seafoods Laboratory, Dept. of Food Science and Technology, Oregon State University, Astoria, OR 97103)
Journal of the Fisheries Research Board of Canada 31, No. 6, 1142-1144 (June 1974)

With a view to possible future large-scale need for emulsified products containing fish flesh, the author determined the functionality of certain species of Oregon groundfish. The specific purposes of the tests were (1) to determine the emulsification capacity of the groundfish as a function of species, (2) to define the variation that might exist between catches over a short-time period as a function of biological condition or handling, (3) to delineate the relative emulsification capacities of chilled fish versus frozen fish muscle, and (4) to determine the effects of certain chemicals (formaldehyde, free fatty acids, or copper ions) on the emulsifying capacity of the fish muscle. Five species of groundfish were used: English sole, sand sole, petrale sole, lingcod, and orange rockfish. These and other species of sole, flounder, hake, cod, and rockfish were used in the test of frozen stored samples.

The English sole, sand sole, petrale sole, lingcod, and orange rockfish emulsified 75-80 ml of oil per gram of muscle. The emulsifying capacity of the muscle of fish caught over a 3-month period showed little variation.

Fish muscle stored at -40° C showed no apparent decrease in emulsifying capacity even after 12 months of storage.

Exposure of the fish muscle to formaldehyde and Cu^{++} caused a decrease in emulsifying capacity, but exposure to Cu^{+} had no significant effect. The addition of 0.02% free fatty acid caused a greater than 20% increase in emulsifying

0.6 FOOD SCIENCE IN DEVELOPING COUNTRIES: A SELECTION OF UNSOLVED PROBLEMS

Anonymous
National Academy of Sciences, National Research Council, Washington, D.C. (1974), 79 pp.

This report of selected unsolved problems in food science in developing countries was prepared by the Advisory Committee on Technology Inovation of the Board on Science and Technology for International Development, Commission on International Relations, National Academy of Sciences-National Research Council. Its object was to stimulate the interest of research workers and technologists in solving these and similar problems.

Each problem is organized under the following headings: Problem Description; Background Information; Possible Approaches to a Solution; Special Requirements; Bibliography; and Key Contacts. The key contacts are persons who have agreed to cooperate in this project by acting as personal contacts to whom the interested reader may turn for advice and information. Forty-two problems under four categories--1. New Foods, 2. Food Processing, 3. Food Composition, and 4. Nutrition and Health--are listed in this collection. Fishery related problems were listed as follows: (1) Aquatic Weeds as a Food Resource, (2) High Cost of Packaging Thermally Processed Foods, (3) Indigenous Sources of Enzymes for More Rapid Fermentation of Fish, (4) Processing Fermented Fish Products, (5) Salt for Preservation Purposes, (6) Fat Composition of Foods Fried in India, (7) Trace Elements in Animal Feeds [India], (8) Malnutrition: A Sociological Maladjustment Syndrome?,

0.6 (9.6) FOOD PRODUCTS FORMULARY VOLUME 1 -- MEAT, POULTRY, FISH AND SHELLFISH

Komarik, Stephan L. (Food Product Development Research, Griffith Laboratory, Chicago, Ill.), Donald K. Tressler, and Lucy Long
Avi Publishing Co., P.O. Box 831, Westport, CT 06880 (1974), 348 pp. Domestic $37.00, foreign $38.00

This book is the first volume of a planned series on food product formularies. It gives detailed procedures for curing meat, the preparation and preservation of various cured meat products, and the preparation and preservation of prepared foods from poultry, fish, and shellfish. The book is organized into 10 sections. The first six deal with meat products. Section 7 concerns soups, gravies, and sauces. Section 8 is on poultry products. Sections 9 and 10 deal with fish, shellfish, and miscellaneous marine products. FTP

0.6

capacity. The chemicals were added to the buffer solution that was used for the aqueous phase of the emulsion. Formaldehyde was added in the form of formalin to levels of 0.04, 0.09, and 0.20%; free fatty acids, in the form of safflower oil hydrolysate, were added to levels of 0.005, 0.010, and 0.020%; and CuCl and $CuCl_2$ were added to levels of 50, 100, and 200 p/m).
[3 tables, 9 references]

FTP

0.6 FISH ODOR IMPROVEMENT

Ajinomoto Co., Inc. (pat.)
Japanese Patent 74 10756
Food Technology 28, No. 8, 96 (Aug. 1974)

Alkyl phthalate derivatives are used to improve the odor of dried fish (including bonito and sardines).

FTP

0.7 RECOMMENDED DIETARY ALLOWANCES

Anonymous
National Academy of Sciences, 2101 Constitution Ave., Washington, DC 20418 (1974), 8th ed., v + 128 pp. $2.50

This is the eighth edition of this book, the classic reference tool for nutrition, dietary, and health professions. The recommended dietary allowances (RDA) are estimates for levels of intake of essential nutrients. They were compiled on the basis of available scientific knowledge. The RDA's are considered to be adequate in meeting known nutritional needs of practically all healthy persons.

The RDA's serve as a guide for developing nutrition programs and establishing standards for public assistance programs. Also, they play a role in the planning and procuring of food supplies for population groups and in the interpretation of food consumption records. Industrial development of new food products is enhanced and influenced by the RDA's.

The contents listing include: General Considerations; Water; Energy; Protein; Essential Fatty Acids and Fat-Soluble Vitamins; Water-Soluble Vitamins; Mineral Elements; and References. There are five tables: Percentiles for weight and height of males and females aged 0-18 years; Examples of daily energy expenditures of mature women and men in light occupations; Suggested weights for heights and basal metabolic rates of adults; Estimated amino acid requirements of man; and Recommended daily dietary allowances.

FTP

0.5 (2.3)

In microbiological sampling of food, a sample is cut directly from the product and macerated. This gives higher recovery of bacterial counts than the swab method. Other methods of sampling meats include shaking a whole chicken or a cube of meat in a plastic bag containing a diluent followed by plating.

In designing the sampling program, the first step is to establish the positions on the processing line that are exposed to direct or remote contamination. Sampling should take place most often at those areas that routinely contact the product; that is, belts, chains, vats, and others (direct contamination). Remote areas do not need frequent sampling for contamination. The sampling plan should be designed to cover overall plant areas in addition to localized areas on the processing line. The amount of sampling should be based on sound statistical methods. The sampling plan should include a capability of detecting a source of contamination and of delineating a microbiological profile of a processing operation.

Modifications of the basic methods used to assess microbiological contamination on surfaces are presented. Additionally, tables in the article compare the various sampling methods for characteristics such as recovery, precision, convenience, error, and application.
[3 tables, 31 references]

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0.6

(9) Iron Fortification of Salt, (10) Systems Approach to Food and Nutrition Policies, (11) Factual Knowledge of Food Consumption Patterns, (12) Microbiological Monitoring Kit for Small Food Plants, (13) Spoilage of Tropical Fish, (14) Evaluating Spoilage of Foods of Animal Origin, (15) Survey of Clostridium botulinum in Tropical Fishing Grounds, (16) Nutritional Factors in Endemic Dental and Skeletal Fluorisis, and (17) Food Science Training. The names and addresses of the 41 contributors of problems for this volume are included.

A copy of this publication may be obtained from the Commission on International Relations (JH 217), NAS-NRC, 2101 Constitution Ave., Washington, DC 20148 U.S.A.

FTP

0.6 BONITO-LIKE FLAVOR

Kikkoman Shoyu Co., Ltd. (pat.)
Japanese Patent 74 12711
Food Technology 28, No. 8, 100 (Aug. 1974)

An oil extract of dried bonito is used to give a bonitolike flavor to foodstuffs.

FTP

0.7 IRON AND COPPER AVAILABILITY FROM VARIOUS SOURCES

McNaughton, James L., Elbert J. Day, and Ben C. Dilworth (Poultry Science Dept., Mississippi Agricultural and Forestry Experiment Station, Mississippi State University, State College, Miss.), and B. D. Lott
Poultry Science 53, No. 4, 1325-1330 (July 1974)

Three experiments, involving a total of 1,110 broiler cockerels, were carried out to determine the availability of iron and copper from various sources. A skim-milk basal diet was fed to the chicks beginning at 1 day of age. Four organic iron compounds (sequestered iron A [10.20% iron], sequestered iron B [12.56% iron], sequestered iron C [8.63% iron], and ferric choline chloride), ferrous sulfate, and ferric oxide were used as the test iron compounds. Added dietary levels of iron compounds in the experiments were 5, 10, and 20 p/m. The test copper compounds were cupric sulfate, cuprous oxide, and cuprous iodide; they were fed at levels to furnish 1 and 2 p/m of copper.

The chicks fed ferrous sulfate and the four organic iron compounds showed no consistent differences in hemoglobin content, hematocrit (packed cell volume), weight, and mortality; these five compounds were significantly superior to ferric oxide. Chicks fed cupric sulfate showed significantly increased hemoglobin content, hematocrit value, and liver copper content as compared to the results with chicks fed cuprous iodide or cuprous oxide. Chicks fed cupric sulfate or cuprous iodide showed increased weight gain and decreased mortality as compared to those chicks fed cuprous oxide. The chick availability values for the compounds tested are shown in the following table.

0.8 REMOTE UNDERWATER FISHERIES ASSESSMENT SYSTEM RUFAS II

Benton, Richard D., Glenn D. Bryant, Martin F. Jue, and J. E. Thomas (Institute of Engineering Technology, Mississippi State University, Mississippi State, MS 39762)
Report No. MASGP74-011, Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS 39564 (May 1, 1974), x + 62 pp.

The RUFAS II (Remote Underwater Fisheries Assessment System) was designed and fabricated by the students and faculty from the Mississippi State University Institute of Engineering Technology. The RUFAS II is a towed, unmanned, underwater vehicle for rapid survey of bottom and midwater resources down to 2,400 feet at towing speeds of up to 4 knots. The vehicle is a vane-controlled hydrodynamic body with sensors of pitch, roll, and height above the bottom. A feedback control system maintains the height of the vehicle above the bottom selected by the operator on the towing vessel. The sea trials of the vehicle demonstrated that it can follow ocean floor contours of 30° at a speed of 2.5 knots.

RUFAS II has two separate camera recording systems. One is a forward looking television camera controlled by the operator viewing a TV monitor equipped with a video tape recorder. Illumination is provided by two forward looking thallium-iodide lights that can move up, down, and horizontally in conjunction with the TV camera. A 35-mm motion picture camera with a strobe light is also secured to the vehicle. This camera, housed in a pressure-tight sphere, can take overlapping photographs for a 24-hour period without a change of film.

0.7 CHANGES IN FOOD INTAKE AND NITROGEN METABOLISM OF RATS WHILE ADAPTING TO A LOW OR HIGH PROTEIN DIET

Peng, Yeh-Shan, Larry L. Meliza, Mitchell G. Vavich, and Arthur R. Kemmerer (Dept. of Agricultural Biochemistry, University of Arizona, Tucson, AZ 85721)
Journal of Nutrition 104, No. 8, 1008-1017 (Aug. 1974)

Animals must adapt to various nutritional conditions in order to survive. Those that fail to adapt will deteriorate, and may even die. Animals respond to dietary changes with alterations in food intake, the activities of specific tissue enzymes, and organ size. The purpose of this study was to extend our knowledge of the adaptation of animals to low or high protein diets. Rats were fed a 10% casein (control) diet (plus 0.3% L-methionine) and then were fed a 2%, 20%, 40%, or 60% casein diet (supplemented with proportional methionine). Examinations were then made of food intake and metabolic alterations related to amino-acid metabolism during the transitional state.

Food intake and weight gain of male rats (135 g) were greater in those fed a 10% casein (plus 0.3% L-methionine) diet than those fed a 2%, 20%, 40% or 60% casein diet supplemented with proportional methionine. On day 3, adaptation to the high casein diets was indicated by increased food intake and also to the 2% casein diet by leveling off of depressed food intake. Ingestion of the 10% casein diet maintained equilibrium between anabolism and catabolism of L-methionine-U-^{14}C which had been added to the diets. The rats fed the 2% casein diet conserved labeled methionine while those fed the high casein diets converted a large portion to CO_2. The high protein groups also retained less absorbed ^{14}C in the carcass.

0.8 (9.10) A DIGITAL ECHO-COUNTING SYSTEM USED IN DETERMINING ABUNDANCE OF FRESHWATER PELAGIC FISH IN RELATION TO DEPTH

Kelso, J. R. M., and E. E. Pickett (Dept of the Environment, Fisheries and Marine Service, Canada Centre for Inland Waters, Great Lakes Biolimnology Laboratory, Burlington, Ontario L7R 4A6, Canada), and R. G. Dowd
Journal of the Fisheries Research Board of Canada 31, No. 6, 1101-1104 (June 1974)

This paper describes the components of a digital echo-counting system for determining abundance of freshwater pelagic fish and the capabilities of the system in studying two widely different fisheries in Lake Erie (smelt) and in Lake Ontario (alewife). The digital echo-counting system consists of a 200 kHz echo-sounder, cathode-ray tube, preamplifier rectifier, and digital logic. The incoming signals were gated by delayed pulses of 6.6 msec duration representing 5 m depth shells from 5 to 25 m in depth. The digital echo-acquisition system responded linearly to fish density. The acoustic estimates of density ranged from 19.3/10,000 m^3 to 524.0/10,000 m^3; midwater trawl estimates of density ranged from 17.4/10,000 m^3 to 420.0/10,000 m^3. There was a high degree of correlation between the densities estimated acoustically and those estimated by midwater trawl. Species differences (smelt in Lake Erie and alewife in Lake Ontario) did not affect acoustic density estimates.
[4 figures, 8 references] FTP

0.7

The low and high protein intake had much greater impact on the nitrogen metabolism of livers than that of brains. The animals were able to redistribute amino acids inside the body according to the needs of tissues. The low protein intake caused alterations in the brain amino acid pattern which qualitatively resembled the changes caused by amino acid imbalance. The concentrations of brain methionine and tyrosine decreased within 3 hours after a single meal. An association between the altered brain amino acid pattern and the decreased intake of the low casein diet was evident.
[3 figures, 6 tables, 38 references]
Abstract of the introduction (first paragraph) and authors' abstract (second paragraph).

0.7 RESPONSE TO LYSINE SUPPLEMENTATION BY LAYING HENS FED PRACTICAL DIETS

Jensen, L. S., C. H. Chang, and L. Falen (Dept. of Animal Sciences, Washington State University, Pullman, WA 99163)
Poultry Science 53, No. 4, 1387-1391 (July 1974)

The requirement for lysine is higher for hens fed rations containing wheat in contrast to that for hens fed corn. In either case, it appears that the requirement for lysine is higher than that currently suggested by the National Research Council.
[4 tables, 13 references] FTP

0.7

Mineral	Source	Mineral availability (chicks) [1]	Relative biological availability (chicks) [2]
		%	%
Iron	Ferrous sulfate	100	100
	Ferric choline chloride	91	94
	Ferric oxide	71	82
	Sequestered iron A	93	100
	" " B	106	104
	" " C	131	104
Copper	Cupric sulfate	100	100
	Cuprous oxide	60	76
	Cuprous iodide	60	82

[1] By regression analysis method of T. S. Nelson and A. C. Walker, Poultry Science 43, 94-98 (1974).
[2] Method by G. W. Pla and J. C. Fritz, J. Assoc. Off. Anal. Chem. 54, 13-17(1971).
[6 tables, 11 references] FTP

0.8

Control of the vehicle and its equipment is accomplished from the operator's console over a down-link telemetry system. Sensing information is transmitted to the console over an up-link telemetry system. All signals move through a single coaxial cable. Electrical power (500 volts, three phase, 60 Hertz) is transmitted over solid conductors. Technical descriptions of the vehicle and its equipment are included in addition to operating and maintenance procedures.
[50 diagrams] SW

0.9 BEHAVIOURAL ASPECTS OF RESEARCH MANAGEMENT -- A REVIEW

Blume, Stuart S. (Civil Service College, 11 Belgrave Rd., London S.W.1, United Kingdom)
Research Policy 3, No. 1, 40-76 (Apr. 1974)

The author attempts to summarize the recent behavioral science literature dealing with the management of research personnel and of the organizational research function. Positive relationships have been found between the effectiveness of productivity of scientists and extent and pattern of communication, the nature of managerial control, incentives provided, sizes and ages of research groups, and functional compared to project organization. Nevertheless, technically successful research is no guarantee of substantial utility for a commercial organization. Although most of the literature concerns the industrial situation, the author does attempt to point out its relevance for management in the public sector.
[61 references] FTP

0.9 U.S. GOVERNMENT SUPPORT FOR CIVILIAN TECHNOLOGY: ECONOMIC THEORY VERSUS POLITICAL PRACTICE

Eads, George (George Washington University, Washington, D.C.)
Research Policy 3, No. 1, 2-16 (Apr. 1974)

During the past few years the U.S. Government has taken new initiatives to stimulate increased commercialization of advanced technology with the aims of improving domestic efficiency and of enhancing international competitiveness. These new series of initiatives were justified, at least in part, by an appeal to an economic concept known as externalities. In this article, the author discusses what he considers as a major gap between the economic concept of externalities as a justification for government intervention in the process of developing commercial technology and the direction that, in practice, this intervention appears to be taking. The author argues that unless the economics profession provides an operational concept of externalities for use by decision makers and monitors the application of that concept to specific situations, externalities may be discovered primarily whenever it is politically advantageous to do so.
[21 references] FTP

0.9 ASSESSING RESEARCH OUTPUT AND MOMENTUM

Faust, R. E. (Roche Research Center, Hoffman-LaRoche Inc., Nutley, N.J., U.S.A.)
Research Policy 3, No. 2, 156-170 (July 1974) [North-Holland Publishing Co., P.O. Box 211, Amsterdam, The Netherlands]

Research organizations are being pressed to assess output and respond to environmental forces demanding productivity and responsiveness to established goals. Thus, research managers are increasingly seeking new approaches to improve overall research and development efficiency. Research planners and administrators in pharmaceutical firms have experimented with several ways to generate new insights and techniques intended to improve the intricate research process. These diverse approaches include programs for developing manager-scientists, arranging for technical audits, emphasing forecasting perspectives, improving government/academic research interactions, seeking extramural new products and promising leads, and revising organization and communication patterns.
[13 references] FTP

1.12 (1.01) TUNA: STATUS, TRENDS, AND ALTERNATIVE MANAGEMENT ARRANGEMENTS

Saila, Saul B., and Virgil J. Norton (University of Rhode Island)
Paper No. 6, Program of International Studies of Fishery Arrangements. Resources for the Future, Inc., Washington, D.C. (June 1974), x + 59 pp. $3.00, paperbound.

There are six major market species of tuna: yellowfin, skipjack, and bigeye found in tropical waters; the bluefins (Thunnus thynnus, T. maccoyi), and albacore found in temperate waters. There are 35 secondary market species of tunalike fishes; bonito is the most important of these. Tunas are wide ranging in their migrations. This adds to the complexity of managing these fisheries.

The tuna fisheries use several methods of catching: longline used by Japan, Republic of Korea, and Taiwan; and surface fishing used mainly by the United States and Japan. The longline fishery takes the largest quantity of tuna; the technique involves setting mainlines with attached branch lines containing up to 2,000 hooks. The method is used to take tuna at great depths and tends to concentrate on larger fish. Live bait fishing is carried on closer to shore. The method consists of using poles with hooks on short lines manned by one or two fishermen. This type of fishery is difficult and hard work. The purse seine technique is used to surround schools of tuna and lift them on board. The method is capital intensive compared to the other methods.

Japan, the United States, Taiwan, the Republic of Korea, France, and Spain account for over 80% of the catch, and Japan accounts for about 40%. The Japanese tuna fleet consists of about 3,000 vessels; about half of these operate in Japanese waters. The deep-sea tuna fleet consists of about 1,200 vessels--primarily

1.0115 (1.0116) ANGLERS' GUIDE TO THE UNITED STATES ATLANTIC COAST. FISH, FISHING GROUNDS & FISHING FACILITIES

Freeman, Bruce L., and Lionel A. Walford (National Marine Fisheries Service, Sandy Hook, N.J.)
National Marine Fisheries Service, NOAA, U.S. Dept. of Commerce, Seattle, WA 98105 (July 1974). For sale by the Superintendent of Documents, U.S. Goverment Printing Office, Washington, DC 20402. Stock numbers 0320-00068 (Section I), 0320-00070 (Section II), 0320-00071 (Section III), 0320-00072 (Section IV).

Four sections of the Anglers' Guide covering the northern half of the Atlantic coast have been issued as follows:

Section I. Passamaquoddy Bay, Maine to Cape Cod [11 pp.] $4.15
Section II. Nantucket Shoals to Long Island Sound [15 pp.] $4.15
Section III. Block Island to Cape May, New Jersey [20 pp.] $4.30
Section IV. Delaware Bay to False Cape, Virgnia [14 pp.] $4.15

Sections V. to VIII covering the southern half of the Atlantic coast are to be printed in the near future.

Each section gives a geographical study of marine recreational fishing with the location of fishing grounds, the various fishing and boating facilities available, local conditions, and characteristics of fishing, life habits, and environmental requirements of fishes along the Atlantic coast. Each section has four to six subarea maps of the tidal shoreline, indicating wetlands; city, county, and federal parks; and wildlife areas. Also shown are principal roads and towns; marinas, ramps, docks, and other fishing facilities; fishing grounds; and locations of wrecks, reefs, and areas where the most popular fishes are commonly caught.

1.26 (1.01111) THE CAPELIN STORY 1973

Duthie, Andrew
1973 Newfoundland Inshore Capelin Development Program, Final Report, Industrial Development Branch, Newfoundland Region, P.O. Box 5667, St. John's, Newfoundland, Canada (1974)

This report is a general overview of the 1973 Newfoundland Inshore Capelin Development Program. It includes 11 technical reports of studies carried out in the program. The purpose of the work was to develop and assist in the establishment of a viable inshore capelin industry in Newfoundland. The study involved an assessment of the extent of the capelin resource, biological research, experimental harvesting, processing, product research and development, and marketing research. The technical reports contained in the appendices are as follows: The capelin ring-net technique, The capelin single vessel midwater trawl technique, Miscellaneous capelin harvesting techniques, Product development--frozen capelin products, Processing and product development--canned capelin products, Impressions of the Icelandic capelin fishery, Some characteristics of inshore spawning capelin, Observations and recommendations on prespawning handling of inshore capelin, Product development of underexploited species, Consumer section, and Progress report--marketing.
[illustrated] FTP

1.0115 (1.0116)

A diagram of the fishes is given along with brief descriptions of their habits, distributions, and seasons of abundance. Also, each section contains a brief discussion of topography, climate, tides, history of fishing, conservation problems, and biology of the commonly caught fishes. Finally, a glossary of fishery terms is given that includes descriptions and diagrams of the artificial baits and lures.
FTP

1.9 (9.14)(9.16) [THE CULTIVATION OF THE EEL]
EL CULTIVO DE LA ANGUILLA

Martinez, J. Rafael Ruano
Vida Silvestre No. 8, 253-259 (Dec. 1973) [In Spanish] Paseo de Infanta Isabel, 1 - Madrid 7, Spain

This article is the last of a series, beginning in 1972, on the biology and cultivation of the eel and includes a description of the final stages in the eel's life cycle. After a period of 8-12 years in rivers and ponds, the well-fed eels migrate to the estuaries and coastal waters where they remain for 1 year, without feeding and become sexually mature. This stage is characterized by a change to black-silver coloring. The mature eels then enter the Atlantic Ocean and migrate to the spawning grounds in tropical waters. After spawning, the eels die.

Cultivation of the eel in Spain has been carried out in densities of 10-12 kg per square meter in running water maintained at 20° to 22° C. In this regime, the eels feed all year with rapid growth. In the winter of 1972-73 the water temperature declined to 8°-10° C. This caused a reduction in the feeding of the eels; in addition, Ichthyophthirius multifiliis Fouquet appeared on the sides of the eels. This organism becomes parasitic on freshwater fishes in crowded conditions. Use of such compounds as copper sulfate and malachite green to dislodge the parasite failed. The parasite disappeared after environmental temperatures rose to 16°-18° C. Studies have been performed to improve cultivation of eels. A diet with the following characteristics has been successful for young eels: protein, 57.6%; fiber, 1%; fat, 5.5%; and ash, 15.1%. The results of the study also indicated that eels should be raised in ponds 0.9 m to 1.0 m deep with a surface area of 500 m^2.
[9 illustrations, 1 table] Mary Ellen Engett

1.012 (9.2) STATUS OF FISHERIES IN PUERTO RICO, 1972

Suárez-Caabro, José A.
Agricultural and Fisheries Contributions (Official Publication of the Centralized and Ancillary Operation Services, Cabo Rojo, Puerto Rico) 5, No. 3, 1-50 (Apr. 1973)

During 1972, a total of 3,681,000 pounds of fish and shellfish was produced from local Puerto Rico fisheries; 85% of the total was fish of various species and 15% was shellfish primarily spiny lobster, land crab, and turtle. The average ex-vessel price was 36 cents per pound for fish and 84 cents for shellfish. The most common species of fish were snapper, grunt, grouper, goatfish, parrotfish, triggerfish, and mackerel. Silk snapper commanded a price as high as $1.25 per pound and spiny lobster as high as $1.75 per pound. The total (ex-vessel) value of the fish and shellfish was $1,574,046. There were 12,371 units of fishing gear reported. Fish and lobster pots constituted 66% of the total gear reported. [4 figures, 9 tables]
FTP

1.12 (1.01)

longliners. The U.S. tuna fleet accounts for about 20% of the world tuna catch (mainly from the eastern Pacific) and is made up of yellowfin, skipjack, and albacore. Since 1961 the major catching capacity of the fleet has changed to the highly mobile purse seiner, and there are over 7,000 fishermen operating on more than 2,000 vessels.

In the Atlantic Ocean fishery for tuna, the Japanese fleet was unchallenged until vessels from the Republic of Korea and Taiwan appeared. All vessels of these countries use the longline or surface techniques. Only the skipjack population appears to have a potential for increased landings. In the Indian Ocean, the development of open ocean fishing for tuna is comparatively recent. Japanese vessels account for a major part of the catch. Catches of Indian fishermen are expected to increase because of their increased fishing effort. Tunalike species such as bonito and frigate mackerels have potential for increased exploitation. In the Pacific, Japanese vessels fished in the western and eastern areas. The vessels of the United States catch about 80% of all tuna in the eastern Pacific. Only the secondary species have a potential for increased exploitation in local areas in the Pacific.

The international trade in tuna amounts to $500 million. Japanese exports account for the largest amount; most of the products are sold in the United States, Japan, and western Europe. Other reports indicate that the yield of tuna can be increased 25% to 35%, and increases in demand for tuna will tend to increase the fishing effort. Without an effective worldwide management program, the major tuna species will, in the near future, probably be exploited beyond the maximum sustainable yields. Regulations by regional commissions acting independently will not be effectual in conserving the stocks. It may be more realistic to establish a management system that includes economic zones, regional commissions, and a global organization.
SW

1.93 (9.11)(9.12) SEAFLOOR SPREADING THEORY AND THE ODYSSEY OF THE GREEN TURTLE

Carr, Archie (University of Florida, Gainesville, Fla.), and Patrick J. Coleman (University of Western Australia, Perth, Western Australia, Australia)
Nature 249, No. 5453, 128-130 (May 10, 1974)

One of the characteristics of a subpopulation of the green turtle (Chelonia mydas) is to inhabit the coastal pasture lands off Brazil and, in the breeding season, nest 2,000 km away on Ascension Island (in the South Atlantic Ocean). No explanations for this behavior are satisfactory. The initial stages in the evolution of the turtle toward this behavior are also not understood. Because of the physical difficulties involved in establishing Ascension Island as a nesting ground during the evolution of the green turtle, explanations based upon the process of natural selection would not be appropriate unless other factors could be involved. The authors suggest that seafloor spreading theory may bear directly upon this aspect; and it may offer evidence toward explaining the ability of the green turtle to navigate the distance between the coast of Brazil and Ascension Island.

Ancient ancestors of the green turtle inhabited the ocean between North America and the northwest coast of the ancient landmass Gondwanaland (which included South America joined with Africa) in the late Cretaceous period about 100 million years ago. Other reports on fossil evidence indicated that separate feeding grounds and nesting areas of the turtle had evolved at this time. The opening of the central Atlantic Ocean marking the separation of South America and Africa, about 80 million years ago, took place in stages: first, rift valley formation

2.1121 AN EFFECTIVE COMBINATION TRAWL FOR WEST COAST DRAGGERS: ATLANTIC-WESTERN TRAWLS

Fisher, R. Barry (Oregon State University)
Publication No. ORESU-TL-74-001, Oregon State University Sea Grant College Program, Corvallis, OR 97331 (Revised July 1974), 33 pp.

A good combination otter trawl for Pacific Northwest fisheries should be effective in capturing bottom species, such as sole, and the various species of round fish swimming freely near the bottom and up to 3 or 4 fathoms from the bottom. Additionally, such a trawl should be able to be worked on vessels of from 90-hp to 500-hp in relatively few net sizes.

A small Atlantic-Western trawl, used by eastern Canadian draggers, was modified to satisfy conditions in which west coast vessels operate. The material used in the trawl was braided polyethylene webbing. The trawl had a headrope length of 54 ft 3 in and a footrope length of 78 ft 1 in. The wings, buntwings, wedges, and apron were constructed of 2.5 mm, 5-in stretch mesh; the four bellies of equal dimensions were made of 2.5 mm, 4½-in stretch mesh web. The lengthening piece was made of 3.0 mm double twine, 4½-in stretch mesh, and the codend was made of 4.5 mm double twine, 4½-in stretch mesh. The boxlike design of the trawl is due to the shape of the panels which also provide good vertical headrope height.

Initial fishing trials of the Model IV-A trawl off the Oregon Coast consistently gave better results than trawlers fishing with other types of trawls.

1.951 (6.86) NEUROPATHOLOGIC OBSERVATIONS OF HEAD TRAUMA IN THE NORTHERN FUR SEAL

Jortner, Bernard S. (Dept. of Pathology, New Jersey Medical School, Newark, NJ 07103)
Journal of Wildlife Diseases 10, No. 2, 121-129 (Apr. 1974)

The Pribilof Islands, in the Bering Sea between Alaska and Siberia, are the breeding grounds for about 80% of the world population of the northern fur seal. Since the discovery of these islands [by Russian explorers] in 1786, the seals have been killed for their pelts. There has been a growing concern among people of the United States about the humaneness of the method used in killing the seals. Because of this concern, a panel of six veterinarians was invited by the National Oceanic and Atmospheric Administration of the United States to evaluate the slaughter of the seals. In the report by C. R. Smith, B. S. Jortner, W. V. Lumb, L. E. McDonald, A. F. Moreland, and W. M. Wass [Ocean Mammal Protection Hearings before the Subcommittee on Oceans and Atmosphere of the Committee on Commerce, U.S. Senate 92d Congress, 2d session, Serial No. 92-56, pp. 456-471 (1972)], the method of seal harvest was described. Batchelor males, 3-4 years old, are herded inland, and about 5 or 6 at a time are driven toward a group of men holding tapered hardwood clubs which are about 155 cm long and weigh about 2.2 kg. The animals support themselves in a semi-erect posture, and their heads are not restricted in movement. The men strike the seals in the head with the clubs, and in almost all cases a single blow is sufficient to produce unconsciousness. Within

2.1121 TRAWL BRACE WITH RAISING AND SUBMERGING GEAR

Stasenko, V. D. et al. (Kaliningrad Fishing Industry and Fish Conservation Res. Inst. & the Fishing Industry Spec. Des. Bur.) (pat.)
U.S.S.R. Patent 395,052
Soviet Inventions Illustrated Section III Mechanical & General 5, No. 23, X2 (July 12, 1974)

This trawl brace consists of a pair of vertical boards with wire and cable fixing points and with raising and submerging gear in between. By means of this equipment the depth of the net can be regulated during the trawling operation [1 figure]. [Copy of patents may be ordered from Patents Supply Div., Derwent Publications Ltd., Rochdale House, 128 Theobalds Rd., London, WC1X8RP, England] FTP

2.115 PAINT FOR REDUCING FRICTION AND RESISTANCE IN WATER

Katsuta, Kihei, and Nobuyoshi Hiroda (Mitsubishi Heavy Industries, Ltd.) (pat.)
Japan. 73 11,567 (Apr. 4, 1973)
Chemical Abstracts 80, No. 24, 135006d (June 17, 1974)

1.951 (6.86)

60 seconds after being struck, the unconscious seals are dead by bleeding from cuts in the heart and great vessels. The seals are then skinned.

In this present report the results of examination of the skulls and brains of 19 seals killed in the harvest are described. All of the seals had depressed comminuted fractures of the skull. Epidural, subdural, and subarachnoid hemorrhage were frequently present. The brain showed varying degrees of laceration, contusion, and hemorrhage. The lesions observed were related to the head trauma. [5 figures, 1 table, 10 references] SW

2.143 IN SITU EXPERIMENTS WITH COASTAL PELAGIC FISHES TO ESTABLISH DESIGN CRITERIA FOR ELECTRICAL FISH HARVESTING SYSTEMS

Seidel, Wilber R. (Southeast Fisheries Center, National Marine Fisheries Service, NOAA, P.O. Drawer 1207, Pascagoula, MS 39567), and Edward F. Klima
Fishery Bulletin 72, No. 3, 657-669 (July 1974)

In situ experiments to test the efficacy of a scale electrical harvesting system were conducted off Panama City, Fla., with both captured and wild coastal pelagic fishes. Six species of fish were exposed to preselected combinations of pulse rate, pulse width, and voltage by either attracting wild fish or placing captured fish between electrodes. Both captured and wild fish could be effectively controlled with a minimum field strength of 15 V/m, 20 to 35 pulses/s, and a pulse width of more than 0.5 ms. Voltage, pulse width, and pulse rate were equally important for controlling the species tested. Based on these results, resistance measurements were calculated and a potential netless harvesting system specified which would require a minimum energy output of 120 kVA dissipated into an electrode configuration 10 × 5 × 5 m with a load resistance of 0.01558 ohms. The basic design specifications for a prototype pulse generator are provided for netless fish harvesting applications and midwater trawling.
[5 figures, 4 tables, 18 references] Authors' abstract

1.93 (9.11)(9.12)

about 110 million years ago; second, progressive ocean flooding with a strong west-to-east component by 90-80 million years ago; and then development of a linked ridge system and the appearance of a single ocean. Volcanic piles are a frequent midocean ridge feature, and some emerge as islands. As ocean floor spreading continues, the volcanic islands move outward from the continents. The ancestral turtles could thus migrate outwards with the volcanic islands without the intervention of the process of natural selection. With regard to the Brazil-Ascension Island route, the authors suggest that the turtle had an inherited tendency to swim a travel path roughly west northwest-east southeast. Since the path is equatorial and seasonal, for a December migration from Brazil the turtle heads directly into the rising sun every dawn and rests and drifts eastward with the current at night. The journey takes about 8 weeks and describes a gentle arc convex to the south. A shift in course is accomplished at the intersection of the travel path and a current containing a plume of solubles in drainage released from Ascension Island. This provides the turtle with a pathway to the island. The equatorial current that carries the sensory compounds also serves to carry the hatchlings, imprinted with the same solubles, away from the ecologically unsuitable island. Additionally, the authors suggest that these migrations of the turtles are an inherited feature that predates other morphological characteristics conventionally used in systematics to define taxa at species levels.
[4 figures, 23 references] SW

2.1121

Smaller modifications of this trawl, for use on smaller draggers, have also given satisfactory results.

Cutting patterns, assembly procedures, and rigging instructions for the trawl are presented. Drawings in the article show the details of panels, cuttings and tapered headrope and footrope, methods of tying meshes, cutting diagrams, and bridle arrangements. SW

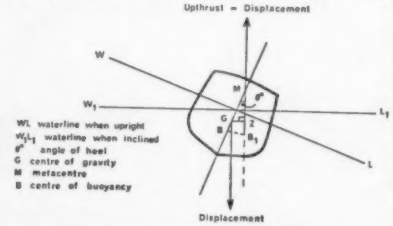
2.1111 ORIGINAL YARN FOR FISHING NET

Momoi, Atsushi (Momoi Fishing Net Mfg. Co., Ltd.) (Pat.)
Japan, 73 37,045 (Nov. 8, 1973)
Chemical Abstracts 81, No. 6, 27081m (Aug. 12, 1974)

2.119 IMPORTANCE OF FISHING VESSEL STABILITY

Rogers, H. E. (Fisheries Division, Dept. of Primary Industry, Canberra, Australia)
Australian Fisheries 33, No. 5, 18-19 (May 1974)

The stability tolerance of a fishing vessel is relatively small compared with that of a larger merchant ship, because the movement of a vessel's center of gravity--due to the loading, shifting, or unloading of a specific weight--increases as the vessel's displacement decreases. A fishing vessel can become unstable when an exceptionally big catch is made and excess fish are carried on deck, or when decks are overloaded with gear while on passage to another port. The free movement of liquids in tanks can be a contributing factor to a vessel's instability. The figure that follows shows a vessel that has been inclined by an external force through an angle heel (θ°). The vessel's ability to return to the upright (its stability) is dependent on the length of the line (GZ) and the displacement. The further the center of gravity (G) is below metacenter (M) the greater will be the tendency of the vessel to return to the upright; if (G) is above (M) the vessel will not return to the upright and will lie at the angle of loll. An approximate check on the initial (GM) for fishing



Factors in vessel stability

3.12 [CHEMICAL TREATMENT TO PREVENT DARKENING OF CRUSTACEANS]
TRATAMENTOS QUÍMICOS PARA EVITAR EL ENNEGRECIMIENTO DE LOS CRUSTÁCEOS

Establier, Rafael (Laboratorio de Cádiz, Instituto de Investigaciones Pesqueras, Puerto Pesquero, Cádiz, Spain)
Technical Report No. 5, Instituto de Investigaciones Pesqueras, Barcelona, Spain (June 1973), 8 pp. [In Spanish]

Various chemicals (potassium metabisulfite, citric acid, sodium hyposulfite, sodium metabisulfite) were tested for use aboard vessel for preventing darkening of crustaceans.
[2 tables, 3 references] FTP

2.8 FISH AND SEAFOOD -- DIVIDEND FOODS
(2.6)(2.9)

Dunn, Charlotte M. (University of Wisconsin)
Public Information Report No. 118, University of Wisconsin Sea Grant College Program, 1225 West Dayton St., Madison, WI 53706 (1974), 23 pp.

In the section "Fish Facts," the completeness of fish as a nutrient is discussed; in addition, the variety of fish products, the versatility in methods of preparing fish for meals, pointers in making the best buys of fish, and the convenience of short cooking times required for fish are also discussed. In the section "Purchasing Guide," the market forms of fish are described with illustrations. The forms of fresh and frozen fish for sale include: whole, dressed, steaks, fillets, chunks, raw breaded portions, and fried portions and sticks. Shellfish are marketed live in the shell, cooked in the shell (crabs, lobsters), headless (shrimp and lobster), shucked or fresh meat (mollusks), cooked meat (crab, lobster, and shrimp), breaded, frozen raw or fried (clams, oysters, and shrimp), and canned. Canned tuna and salmon products are described, and menus that can be prepared with them are given. A guide showing the forms of fish and shellfish and the amounts required for six servings is given. The section is concluded with information on judging the freshness of fresh and frozen finfish, and shellfish. In the section "Handling and Storing Fish and Seafood," the procedures to minimize spoilage are described. Fresh fish should be refrigerated immediately at 35°-40° F in original leakproof wrapping for no longer than a day or two before cooking. Canned products should be stored in a cool dry place. Commercially packaged frozen

3.2381 PROTECTIVE STARCH ICE-GLAZING COMPOSITION

Nakano, Sohta et al (Tokyo, Japan) (pat.)
Canadian Patent 950,744
Patent Office Record [Canada] 102, No. 28, 32 (July 9, 1974)

This ice-glazing improver consists of a composition of a low-viscous, decomposed product of starch, or its hydrophilic derivative, and a highly viscous water-soluble viscidizer. FTP

3.2387 METHOD AND PACKAGE FOR STORING AND SHIPPING MARINE LARVAE

Budge, William H. (Hillsborough, Calif., U.S.A.) (pat.)
Canadian Patent 951,197
Patent Office Record [Canada] 102, No. 29, 31 (July 16, 1974)

This invention involves a method and package for storing marine larvae, such as oyster larvae. The marine larvae, at or near the state of metamorphosis, are cooled to a temperature well below the larval-growing temperature to prevent metamorphosis during the period of storage and shipment. FTP

2.8 (2.6)(2.9)

fish should be stored in the original wrapper in the freezer at 0° F or lower. Never refreeze thawed fish. Fresh shellfish should be stored at 32° F and eaten on the same day of purchase. Cooked fish and seafood can be stored in the refrigerator or freezer. In the former do not hold longer than 2 days; in the latter do not store more than 3 months. Tables on storage life of frozen fish and how quality is lost are given along with a description of how to thaw frozen products. In the last section, "Fish Cookery," three guides to successful cookery are given: never overcook, know your product, and handle with care. Methods and recipes are given for poaching, steaming, broiling, baking, planking, charcoal broiling, pan frying, oven frying, deep fat frying, and for fish spreads, soups, and boilings.
SW

2.119

boats up to 70 m long may be made by timing the roll period and applying the following equation.

$$GM = \left(\frac{fB}{T}\right)^2$$

where: f = factor for the rolling period; B = breadth (width) in meters; T = time for a full rolling period in seconds. For fully loaded fishing boats before fishing, the following average "f" values have been observed: double boom prawn fishing boats, f = 0.95; deep-sea fishing boats, f = 0.80; and for boats with a live fish well, f = 0.60. A long period of roll corresponding to m (GM) of 0.2 m or below indicates low stability. If a vessel becomes unstable the center of gravity should be lowered by (1) removing weights from above the vessels center of gravity; shifting weights downward, filling up slack tanks; and adding bottom weight such as ballast. The Intergovernmental Consultative Organization (IMCO) criteria for the stability of vessels, relative to the figure are included. Remedial actions to be taken for righting a vessel are also given.
[1 figure]
SW

3.4 SMOKE FLAVORS

Iwatare, S. (pat.)
Japanese Patent 74 08866
Food Technology 28, No. 8, 100 (Aug. 1974)

Pyroligneous acid is allowed to stand, during which time carbonyl compounds resinate with phenols. The resinated solids are separated, and the remaining liquid is distilled below the melting points of carcinogenic substances. The distillate is then allowed to stand to precipitate additional solids.
FTP

3.4 SMOKED FLAVOUR COMPOSITIONS

Canelle, Arthur J. (Sutton, Surrey, England) (pat.)
Canadian Patent 950,263
Patent Office Record [Canada] 102, No. 27, 24-25 (July 2, 1974)

Water-insoluble smoked flavor imparting preparations are converted into stable aqueous emulsions for use in the brine curing of meat and fish.
FTP

3.20 (0.6)(3.24) FREEZING AND STORAGE OF FISH, POULTRY AND MEAT

Anonymous
International Institute of Refrigeration, 177, Blvd. Malesherbes, 75017 Paris, France (1973), 386 pp., F 100

This document is the most recent in the series "Refrigeration Science and Technology," under which title the International Institute of Refrigeration publishes the proceedings of the meetings of its scientific and technical Commissions. This document reports on the work of Commissions C2 (Food science and technology) and D1 (Refrigerated storage) which met in Warsaw (Poland) during October 10 to 13, 1972.

Forty-five reports were presented by leading experts on matters relating to the freezing and storage of fish, poultry and meat. These reports originated from 12 countries, viz. Bulgaria, Denmark, France, German Federal Republic, Italy, The Netherlands, Poland, Rumania, United Kingdom, U.S.A., U.S.S.R. and Yugoslavia. Thirty-six reports are in English with nine in French. Each paper reproduced in extenso, carries a summary in the other language and the discussions that followed its presentation.

The general theme of the meeting covered the freezing and storage of meat products. The various communications deal with either the biological behaviour of these products or with freezing and storage techniques specially adapted to these foodstuffs.
Reprinted

3.5 (8.)(3.8) BIOCHEMICAL ASPECTS OF THE FERMENTATIVE RIPENING OF PRESERVES OF ANCHOVIES

Establier, Rafael, and Manuel Gutiérrez (Laboratorio del Inst. de Invest. Pesqueras, Puerto Pesquero, Cádiz, Spain)
Investigacion Pesquera 36, No. 2, 327-340 (Sept. 1972) [In Spanish, English summary]

Preparation of cured anchovies from fresh and presalted fish was studied. Data are given on the chemical composition of the muscle of the anchovies during the curing process and on the changes in total, nonprotein, and amino/ammonia nitrogen in the brine. Brine curing at elevated temperature (27° C) reduced the curing period by about 50% as compared to the time required for curing at room temperature.
[3 figures, 5 tables, 6 references] FTP

3.39 (3.2349)(4.) SEPARATION OF FATS FROM PROTEIN-CONTAINING MIXTURES

Hashimoto, Kohei, Kentaro Hara, Norimoto Yamazaki, and Koji Mitsugi (Ajinomoto Co., Inc.) (pat.)
Japan. Kokai 73 89,207 (Nov. 21, 1973)
Chemical Abstracts 80, No. 22, 122668w (June 3, 1974)

4.60 (0.34) A REACTION PRODUCT FROM BUTYLATED HYDROXYANISOLE AND TRIMETHYLAMINE OXIDE

Ishikawa, Yukihiro, and Etsuji Yuki (Hiroshima Food Research Institute, Hijiyama-honmachi, Hiroshima, Japan)
Agricultural and Biological Chemistry [Japan] 38, No. 6, 1227-1233 (June 1974)

In earlier work, the junior author found that cuttlefish fried in a plant oil (such as soybean oil) had a comparative longer shelf life than did other foods fried in oil. It appeared that trimethylamine oxide (TMAO) was responsible for the extended shelf life of the product. TMAO seemed to exert a synergistic effect on phenolic-type antioxidants such as the tocopherols and BHA (butylated hydroxyanisole). TMAO, itself, does not have any effect on the oxidation of oils, but may under certain conditions act as a prooxidant. The purpose of the present study was to examine the structure and the synergistic activity of the main reaction product obtained when BHA and TMAO are heated in liquid paraffin under nitrogen at 180° C for 1 hour. A crystalline substance was obtained by silica gel chromatography; it was the BHA dimer of the biphenyl-type (2,2'-dihydroxy-5,5'-dimethoxy-3,3'-di-tert-butyl biphenyl). The BHA dimer showed antioxidant activity inferior to that of BHA, but it did show a synergistic effect with TMAO.
[8 figures, 2 tables, 11 references] FTP

4.2 (1.953) UNUSUAL LIPIDS II: HEAD OIL OF THE NORTH ATLANTIC PILOT WHALE, GLOBICEPHALA MELAENA MELAENA

Blomberg, Jonas (Institution of Medical Biochemistry, University of Göteborg, Göteborg, Sweden)
Lipids 9, No. 7, 461-470 (July 1974)

An investigation was carried out to determine the general lipid composition of the head oil of the pilot whale. The sample of oil analyzed was slightly yellow, free flowing, and free of a detectable rancid odor. The oil was analyzed by use of chromatographic techniques and mass spectrometry. Alcohols were prepared from unsaponifiable fractions in the oil; subfractions of triglyceride subclasses were prepared from crude triglycerides in columns containing activated silica and monitored for purity by thin-layer chromatography. Methyl esters, isopropyl esters, and acetates of the fatty acids present were also prepared to determine the fatty acid composition of the oil.

The following groups were found in the oil: hydrocarbons, 3%; waxes and cholesterol esters, 9%; and triglycerides, 87% (consisting mainly of analogs of isovalero triglycerides, and small amounts of cholesterol and diglycerides). The diisovalero triglycerides were shown to be mostly symmetrical. The esters of the longer fatty acids were either isobranched, normal, saturated, or monounsaturated; isovaleric acid was the major fatty acid (54% of the fatty acids) in the oil. All the other fatty acids contained 10-18 carbon atoms. A 5-carbon fatty acid was the only acid found in the waxes. The alcohols were analyzed as acetates, as trimethylsilyl ethers, and as alcohol derived hydrocarbons. Isosaturated, normal,

4.92 (0.7) EFFECT OF DIETARY SELENIUM AND AUTOXIDIZED LIPIDS ON THE GLUTATHIONE PEROXIDASE SYSTEM OF GASTROINTESTINAL TRACT AND OTHER TISSUES IN THE RAT

Reddy, K., and Al L. Tappel (Dept. of Food Science and Technology, University of California, Davis, CA 95616)
Journal of Nutrition 104, No. 8, 1069-1078 (Aug. 1974)

Oxidized fats and their products are toxic to animals; however, the primary mechanism of their toxicity and their metabolic fate have not been delineated. One theory on the fate of dietary peroxides is that feeding peroxides to rats leads to their appreciable concentration in tissues. Another theory is that the peroxides are decomposed during absorption from the gut. This investigation was carried out to evaluate the role of dietary selenium in the metabolism of dietary autoxidized lipids.

The effect of dietary selenium on the detoxification of dietary peroxides via the glutathione peroxidase system was studied. Rats were fed Torula yeast-based selenium-deficient diets with either 15% fresh tocopherol-stripped corn oil or 15% autoxidized corn oil with a peroxide value of 692 mEq/kg. Rats fed these two diets were further divided into groups that were fed either 0 or 2 ppm selenium as selenomethionine. Body weight gain of the two groups of rats fed the autoxidized oil was significantly lower than that of the two groups fed fresh corn oil. The specific activity of glutathione peroxidase in various regions of the gastrointestinal tract, liver, blood, and adipose* from selenium-supplemented rats was significantly higher than in these tissues from the nonsupplemented rats. In

4.2 (1.953)

saturated, and monounsaturated alcohols occurred in the oil and corresponded to the fatty acids qualitatively.

The head oil sample came from the fatty melon in the head of the pilot whale. The fatty melon may be used as an acoustic lens which transmits sounds to the inner ear of the whale, and thus may be important in the echolocation behavior of the whale. The author suggests that the composition of the head oil of the pilot whale, in relation to low sonic absorption, may have a specific function in echolocation.

[8 figures, 4 tables, 30 references] SW

4.92 (0.7)

the rats not supplemented with selenium, glutathione peroxidase activity was significantly increased in the group fed autoxidized corn oil; increased activity was not observed in tissues of selenium-supplemented rats fed peroxides. With few exceptions, glutathione reductase activity was the same in tissues from each of the four dietary groups. Significantly more peroxide accumulated in the adipose* of the peroxide-fed rats not supplemented with selenium than in the adipose* of the other three groups. * [sic]

[2 figures, 5 tables, 39 references] Abstract of the introduction (first paragraph); authors' abstract (second paragraph).

4.11 MODIFICATION OF THE AOAC QUALITATIVE TEST FOR THE DETERMINATION OF FISH OILS AND MARINE OILS

Schwien, William G. (Food and Drug Administration, 909 First Avenue, Seattle, WA 98104)

Journal of the Association of Official Analytical Chemists 57, No. 4, 1005 (July 1974)

Marine oils contain pentaenic (20:5) and hexaenic (22:6) fatty acids which are not found in nonfish oils. The AOAC qualitative test for the detection of fish and marine oils in vegetable oils specifies a bromination step that results in an insoluble precipitate when the two marine oil fatty acids are present. This procedure has two disadvantages: the use of strong bromine, and the dark solution that results from the addition of bromine. The dark solution obscures the precipitate so that a definitive test results only from the most copious of precipitations. A modification of the procedure made by M. F. Lauro [J. Amer. Oil Chem. Soc. 47, 234 (1970)] is suggested. A dilute bromine solution in the modified procedure allows the precipitate to be seen more clearly. The amount of the precipitate can be measured and can be used to determine the amount of fish oil present. This modification adds reliability to the procedure, and the Associate Referee recommends its adoption to replace the current AOAC qualitative test for the determination of fish oil in vegetable oil. SW

4.64 ANTIOXIDANT MIXTURES FOR USE IN FOOD

Pongracz, G. (Res. Dept., F. Hoffmann-La Roche & Co., Ltd., 4002 Basel, Switzerland)
International Journal for Vitamin and Nutrition Research 43, No. 4, 517-525 (1973)
Food Science and Technology Abstracts 6, No. 3, 207, Abstract No. 3T157 (Mar. 1974)

Ascorbic acid esters and their combinations with several antioxidants and synergists(tocopherols, lecithins, gallates, and butylated hydroxytoluene) were investigated for antioxidant effect in soybean, sunflower, palm, and peanut oils, butterfat, and lard. The combinations of ascorbic acid esters with the antioxidants and synergists yielded products which are widely approved for human consumption and also have very good antioxidant properties. The quality of lecithins is an important factor in the increase of the antioxidative potency of the ascorbic acid esters. SW

4.60 PLICATAMIDES

Buchholz, Richard F., and Marten Reintjes (International Telephone and Telegraph Corp.)(pat.)
U.S. Patent 3,810,941
Chemical Abstracts 81, No. 5, 25452j (Aug. 5, 1974)

4.15 RECOVERING SUBSTITUTED ALKYL- OR ALKENYLGLYCERYL ETHERS FROM NATURAL LIPID

Hallgren, B. E., G. A. M. Stallberg (Astra Nutrition AB) (pat.)
Sweden 360,647 (Oct. 1, 1973)
Chemical Abstracts 80, No. 22, 124746u (June 3, 1974)

6.15 (1.89)(0.6) SQUID PROTEIN ISOLATE: EFFECT OF PROCESSING CONDITIONS ON RECOVERY YIELDS

Kahn, Leslie N., Zeki Berk, Ernst R. Pariser, Samuel A. Goldblith, and James M. Flink (Dept. of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)
Report No. MITSG 74-30, M.I.T. Sea Grant Program, Massachusetts Institute of Technology, Cambridge, MA 02139 (June 28, 1974), 4 pp.

Several process variables may be expected to influence the rate and amount of extraction and the quality of protein extracted from squid of the Loligo species. These variables are concentration and particle size of suspended tissue, extraction time, pH of the extracting solution, type and concentration of salts used in the extraction, and extraction temperature. This article is a report of a detailed investigation of the influence of various processing conditions on the extraction and recovery of protein from squid tissue.

The proximate analysis of squid tissue is as follows: water, 80%; protein, 17%; lipids, 1.5%; and ash, 1.3%. Frozen squid were thawed, cleaned, eviscerated, skinned, and ground in a food grinder. Each sample of squid tissue was ground to to a specific fineness. A slurry was prepared by adding ground tissue to various aqueous concentrations (1-5%) of either sodium chloride, sodium trimetaphosphate, or sodium hexametaphosphate. The extraction variables were particle size, 2.38-8 mm; pH of the extraction medium, 2.5-11.0; extractant to tissue ratio, 20:1-3.3:1; temperature, 5°-60° C; and time, 15-60 min. The pH of the slurries was

6.190 1974 FEEDSTUFFS ANALYSIS TABLE

Anonymous
Feedstuffs 46, No. 26, 22-23 (July 1, 1974)

The feedstuffs analysis table contains data on 88 feedstuffs giving their content of protein, fat, fiber, calcium, phosphorus, ash, dry matter, productive energy, metabolizable energy, ruminant T.D.N. (total digestible nitrogen), riboflavin, niacin, pantothenic acid, thiamine, choline, arginine, lysine, methionine, cystine, tryptophan, and glycine. Data are included on five fish meals (anchovy, herring, menhaden, red fish, and tuna) and on fish solubles. The table is intended to help feed manufacturers and animal nutritionists in formulating feeds. The data given for each feedstuff are not average values, but are values that include a "margin of safety" so that the feed will contain at least as much protein, fat, minerals, and vitamins, and not as much fiber as the final calculations show. Additional tables show the calcium and phosphorus content of 17 mineral products (includes oyster shell); the magnesium, potassium, and sulfur content of 33 selected feedstuffs (includes fish meal); and the additional amino acids (other than those listed in the feedstuffs analysis table: histidine, isoleucine, leucine, phenylalanine, tyrosine, threonine, and valine) and vitamins (carotene, xanthophyll, alpha tocopherol, folic acid, vitamin B_{12}, and biotin) in 39 feedstuffs (includes menhaden fish meal).

Reprints of the 1974 Feedstuffs Analysis Table are available from Feedstuffs, Reader Service Dept., P.O. Box 67, Minneapolis, MN 55440. Single copy 50 cents; 2 to 9 copies, 30 cents each; 10 or more copies, 25 cents each. FTP

6.190 EFFECTS OF ANCHOVY FISH MEAL IN BROILER DIETS

Avila, E., and S. L. Balloun (Dept. of Animal Science, Iowa State University, Ames, IA 50010)
Poultry Science 53, No. 4, 1372-1379 (July 1974)

The purpose of this study was to determine the response in growth and feed efficiency of broilers when part or all the soybean meal in a corn-soy diet was replaced with fish meal. Four feeding tests were carried out using a total of 1,392 male broilers. The chicks were housed in electrically heated batteries. The birds were reared to 1 week of age on a starter diet and then were randomly assigned to the treatments. Samples of anchovy meal from the same lot were used in all the tests; in one test herring fish meal was also used. Three experiments were terminated when the broilers were 4 weeks old; one experiment was terminated when the broilers were 7 weeks old. Five diets were used having graded levels of anchovy fish meal from 0% to 100% depending upon the experiment. Herring fish meal, when used, entirely replaced the soybean meal. All diets were maintained isonitrogenous and isocaloric, and contained a similar content of calcium and phosphorus.

When anchovy fish meal replaced soybean meal at the 2, 4, 6, and 8% levels in a 20% protein corn-soymeal diet, no differences were found in body weight or feed efficiency of the chicks. Corn-soybean meal diets were superior (as measured by weight gain and feed efficiency) to corn-anchovy fishmeal diets when fed at four levels of protein of 12, 15, 18, and 21%. Corn-herring fishmeal diets produced greater weight gains of chicks than did either corn-anchovy fish meal or corn-soybean meal diets. The performance of chicks fed anchovy fish meal and

6.199 EFFECTS OF DIETARY FISH MEAL LEVEL ON FLAVOR OF PRECOOKED, FROZEN TURKEY MEAT

Webb, J. E., C. C. Brunson, and J. D. Yates (Campbell Institute for Agricultural Research, Campbell Soup Company, Fayetteville, AR 72701)
Poultry Science 53, No. 4, 1399-1404 (July 1974)

Anchovy fish meal was fed to young turkeys at levels of up to 10% of their diets and then withdrawn from the diets for up to 8 weeks preslaughter to determine the effect on development of fishy flavor and rancidity in the precooked, sliced, frozen turkey breast meat. One hundred and twenty male turkeys, grown on conventional rations to 13 weeks, were placed in 12 pens and were fed the experimental diets for 16 weeks. Anchovy fish meal was used at 2, 4, 6, 8, and 10% of the diets. Following slaughtering and ageing of the birds, the breast meat was removed, packaged, and frozen at -40° C. TBA [thiobarbituric acid] numbers were used as an indication of the degree of rancidity of the meat; fishy flavor and odor were evaluated by a taste panel. Feeding the turkeys 6, 8, or 10% anchovy fish meal for 16 weeks with no withdrawal produced meat that was significantly more fishy and more rancid than the control product (from turkeys fed the diet containing no fish meal). Feeding the turkeys diets containing 2% or 4% fish meal with no withdrawal of the fish meal produced meat with ratings that were not significantly (statistically) different from that of the controls. When the length of time of withdrawal of the fish meal was increased from 0 to 8 weeks preslaughter for diets containing 8% or 10% fish meal, a trend for better quality

6.190

soybean meal was similar. Methionine supplementation of diets containing fish meal effected no change in growth response of the chicks. In the experiment where anchovy fish meal replaced soybean meal at levels of 20, 40, 60, 80, and 100%, there were no differences in the body weights of the chicks or in feed efficiency except where the anchovy fish meal replaced all the soybean meal. Growth of the chicks was depressed in the test where anchovy fish meal entirely replaced the soybean meal. Chicks fed anchovy fish meal did not show signs of erosion of their gizzard lining.
[8 tables, 13 references] FTP

6.19 POSSIBILITY OF FISH MEAL STERILIZATION BY γ-IRRADIATION (3.15)

Bancher, E., H. Willinger, J. Washuettl, F. Chods, and G. Thiemann (Inst. Bot. Tech. Mikrosk. Org. Kobst., Tech. Hochsch. Vienna, Austria)
Chemical Abstracts 81, No. 3, 11961n (July 22, 1974)

6.190

meat was indicated (on the basis of TBA numbers and taste value scores). Taste panel ratings indicated beneficial effects from withdrawing the 10% fishmeal level for 4, 6, or 8 weeks preslaughter, and from withdrawing the 8% fishmeal level for 4 to 8 weeks preslaughter.
[4 tables, 14 references] FTP

6.194 THIAMINASE I IN MARINE FISH. III. VITAMIN B_1 DEFICIENCY (0.38) DISEASE OF CHICKEN CAUSED BY INCLUSION OF ANCHOVY IN DIET

Ishihara, Tadashi, Hisashi Kimari, and Masato Yasuda (Fac. Fish. Nagasaki Univ., Nagasaki, Japan)
Chemical Abstracts 80, No. 25, 144548j (June 24, 1974)

6.15 (1.89)(0.6)

maintained by the addition of dilute sodium hydroxide or hydrochloric acid. Following extraction, the slurry was centrifuged at 3,000 × G for 10 min. The supernatant was decanted through a glass wool filter and analyzed for nitrogen. The protein from the extraction at pH 11.0 was precipitated at the isoelectric point and recovered by centrifugation. The supernatant was analyzed for protein.

Relative to the fineness of grind, the highest yields of protein were extracted from the squid tissue that was ground to the smallest size, 2.38 mm. The use of frozen and thawed, or fresh squid tissue had no appreciable effect on the protein yield. The duration of extraction influenced the protein yield. Extraction of squid protein took place rapidly; little protein was extracted after 30 min. At pH of 4.5-5.5, the protein has minimum solubility. At pH 2.5 the solubility increases to 81% and to 88% at pH 11.0. The pH was adjusted using NaOH or HCl. The protein extraction yields increased with increasing extractant to tissue ratios. High extractant to tissue ratios result in very dilute extracts; low ratios yield more concentrated protein extracts but problems of viscosity and gelation appeared. The largest yield of protein occurred at 22° C with 0.6M sodium chloride in solutions at pH 2.5 and pH 11.0. A cooked odor and milky color were noticeable at temperatures of 45° and 60° C. The greatest solubilization of protein was carried out with sodium hexametaphosphate and sodium chloride, both at a level of 4%. For economic and safety reasons sodium chloride is preferred. About one-third of the nitrogen remains in the whey after isoelectric precipitation. Recovery of this fraction requires different procedures. The curd from the isoelectric precipitation was spray dried at high temperatures. The salt extracts were membrane desalinated until the salt/protein ratio was reduced from 2.8 to 0.2. The extract was then spray dried.
[7 figures, 12 references] SW

6.193 GROWTH FACTORS IN THE FISH MEAL COMPONENT OF CATFISH DIETS

Andrews, James W., and Jimmy W. Page (University of Georgia Agricultural Experiment Station and Skidaway Institute of Oceanography, P.O. Box 13687, Savannah, GA 31406)
Journal of Nutrition 104, No. 8, 1091-1096 (Aug. 1974)

In earlier work by the senior author and his colleagues, there were indications that fish meal contained growth factors for catfish that were not present in sufficient quantity in soybean meal. Thus, the present study was carried out to provide more information on the growth factors for catfish that are present in fish meal, but are not provided by an isonitrogenous substitution of soy protein.

Four feeding studies were conducted to determine to what extent soybean meal could be used to replace fish meal in diets for channel catfish (Ictalurus punctatus). When soybean meal was substituted on an isonitrogenous basis for menhaden meal, growth and feed efficiency were substantially reduced ($P < 0.05$). Gains were not enhanced when synthetic methionine, cystine or lysine, the most limiting amino acids as the results of this substitution, were added to the soy-substituted diets. When diets void of fish meal were supplemented with a lipid extract, nonlipid residue or ashed fraction of menhaden meal, growth and food conversion data revealed that the growth factors not provided by soybean meal were in the nonlipid residue of menhaden meal and were destroyed by ashing. A further study demonstrated that these factors were not polar lipids that could be removed by extraction with chloroform-methanol (2:1). These data suggested that the growth factors were in the protein fraction of menhaden meal but do not explain why growth responses were not obtained when the soy-substituted diets were supplemented with the most limiting amino acids.
[6 tables, 12 references] Abstract of the introduction (first paragraph); authors' abstract (second paragraph).

6.32 [COMPONENTS OF EDIBLE MARINE ALGAE IN KOREA. I. THE COMPONENTS OF SEVERAL EDIBLE BROWN ALGAE]

Shim, S. C., H. O. Cho, and C. O. Rhee (Radiation Res. Inst. in Agric., Office of Atomic Energy, Seoul, S. Korea)
Journal of the Korean Agricultural Chemical Society 14, No. 3, 213-220 (1971) [In Korean and English]
Food Science and Technology Abstracts 6, No. 3, 155, Abstract No. R125 (Mar. 1974)

Twelve species of Korean brown algae, 10 edible and 2 nonedible, were analyzed for their composition. The algae were found to contain: moisture, 14%-16%; crude protein, about 16%; crude fat, 0.7%-2.0%; crude fiber, 3%-8%; crude ash, 9.17%-16.89%; reducing sugars, 0.27-2.49%; calcium, 1.73%-2.51%; sulfur, 1.0%-1.8%; magnesium and iodine, 01.%-1.0%; potassium and sodium, 1%; iron and zinc, 0.01%-0.03%; copper and manganese, 0.001%-0.005%. SW

6.32 ISOLATION OF PHENYLACETIC ACID AND ITS p-HYDROXY DERIVATIVE AS AUXIN-LIKE SUBSTANCES FROM UNDARIA PINNATIFIDA

Abe, Hiroshi, Masaaki Uchiyama, and Rokuro Sato (Dep. Plant Prot., Tokyo Univ., Agric. Technol., Euchu, Japan)
Chemical Abstracts 81, No. 3, 10963c (July 22, 1974)

7.81 (7.44) DETERMINATIONS OF AMMONIA LEVELS IN WATER AND WASTEWATER WITH AN AMMONIA PROBE

Evans, W. H., and B. F. Partridge (Dept. of Trade and Industry, Laboratory of the Government Chemist, Cornwall House, Stamford Street, London, SE1 9NQ, England)
Analyst 99, No. 1179, 367-375 (June 1974)

The recommended methods for determination of ammoniacal nitrogen in potable and wastewaters involve distillation of ammonia from an alkaline medium or from a phosphate buffer. Albuminoid nitrogen is determined on the same sample of water by distillation from alkaline permanganate. Both distillates are subsequently subjected to spectrophotometric or titrimetric determinations of nitrogen. A commercial probe has been reported to be used to measure free ammonia levels in boiler feed water. An investigation was carried out on the possible laboratory application of the probe to determinations of ammoniacal and albuminoid nitrogen in raw potable waters and waste waters.

The probe is a Model 8002-2 of Electronic Instruments Ltd.; it consists of a glass pH electrode, surrounded by a thin film of a filling solution of ammonium chloride in contact with a gas permeable hydrophobic membrane. Free ammonia in a sample passes through the membrane until the partial pressures in the sample on the outside of the membrane and in the thin film of ammonium chloride on the inside of the membrane are equal. In this steady state, the ammonia-ammonium ion equilibrium in the thin film gives a value for the hydrogen ion concentration; this is reflected by corresponding changes in potential of the glass pH electrode referred to a silver-silver chloride electrode in contact with the the filling solution.

6.51 COMPOSITION, PROCESSING, AND UTILIZATION OF RED CRAB (PLEURONODES PLANIPES) AS AN AQUACULTURAL FEED INGREDIENT

Spinelli, John, Lawrence Lehman, and Dave Wieg (Pacific Fishery Products Technology Center, National Marine Fisheries Service, NOAA, Seattle, WA 98112)
Journal of the Fisheries Research Board of Canada 31, No. 6, 1025-1029 (June 1974)

Red crab appears highly suitable for use as a dietary component of feed for salmon. For use as a feed component, the red crab were comminuted in a vertical cutter/mixer, and then the resulting pulp was passed through a strainer. For use in feeding tests with rainbow trout, the red crab was added to a basic diet containing fish meal (35%), oat flour (4.3%), wheat germ (4.3%), crab meal (2.1%), kelp meal (2.1%), vitamin premix (1.0%), choline chloride (1.2%), salmon viscera (25.0%), and shrimp waste (25.0%). When the red crab was added to the basic diet, it replaced an equivalent amount of shrimp waste.

The proximate composition of the red crab was (three batches from three separate areas): moisture, 75.0% to 86.3%; protein, 5.5% to 10.2%; ash, 3.2% to 4.8%; lipids, 0.9% to 3.5%; chitin, 1.3% to 1.8%; and carotenoids, 10-12 to 12-16 µg/100 g. About 40% of the fatty acids was linolenic acid. The rainbow trout fed red crab at levels of 10% and 25% of a basic diet, were highly pigmented after 2 months of feeding the test diet.
[1 figure, 5 tables, 23 references] FTP

9.1 (9.16) MARINE AND FRESHWATER AQUARIUM SYSTEMS FOR TROPICAL ANIMALS

Chave, E. H., and P. S. Lobel
Sea Grant Advisory Report UNIHI-SEAGRANT-AR-74-01, University of Hawaii, Honolulu, Hawaii (Apr. 1974), vii + 88 pp.

Information on tropical aquatic organisms and their maintenance is presented in this report. The information provided is intended as a baseline for the beginner and as text material in teaching. Plants, invertebrates, and tropical fresh- and saltwater fishes are described with illustrations; suggestions for their applicability in aquariums are also given. Aquarium structures, water chemistry, filtration, and temperature are the subjects covered on the building and maintenance of an aquarium. Suggestions are given on the introduction of animals and plants to the aquarium. Collecting and transportation of plant and animal specimens are covered. Recommendations are made regarding spawning and the rearing of specimens. The food requirements and feeding habits of the fish and invertebrates are described. Diseases and treatments are discussed. Camouflage, aggression, and parasitism are also discussed. There are 49 references in the bibliography, and a suggested reading list for self-education in underwater and aquarium photography is also given.
[15 illustrations] SW

6.54 BONITO FLAVOR SEASONING

Nobehara, Akio (Kikkoman Shoyu Co., Ltd.) (pat.)
Japan. 73 06,540 (Feb. 27, 1973)
Chemical Abstracts 81, No. 3, 12068p (July 22, 1974)

8.8 [ON THE ASSESSMENT OF FISH QUALITY]
ÜBER DIE QUALITATSBEURTEILUNG VON FISCH

Trommsdorf, H. (Bundesforschungs-anst. Fisch., 2 Hamburg 50, Federal Republic of Germany)
Inf. Fischwirtsch. 20, Nos. 4/5, 138-142 (1973) [In German]
Aquatic Sciences & Fisheries Abstracts 4, No. 3, 243, Abstract No. 4Q2884M (Mar. 1974)

The liquid breakdown products and free amino acids present in fish protein were studied to establish criteria for the quality of stored fish. Changes in amino-acid spectrum of alcohol extracted flesh were identified with ion-exchange chromatography. The key amino acids established for cod and codling were anserine, creatinine, taurine, α-alanine, glycine, and β-alanine; that is, reduction of anserine to less than 23% or increase of β-alanine to more than 13% of amino acids present would indicate a decline in quality of the fish. The free amino-acid spectrum of Sebastes marinus was determined in fillets taken from whole fish already stored for 9-18 days in ice. The determinations were made in the fillets after 3, 7, 10, 24, and 28 days of storage. There was a marked reduction of creatinine and slight reduction of glycine and α-alanine in the fresh fillets. Fillets from the stored fish contained decreased amounts of lysine, urea, histidine, and sarcosine; there were initial increases in the amounts of creatinine and proline and then decreases. "Indicator" amino acids should be sought in all commercial fish. Liquid aroma substances were identified after high-vacuum low-temperature distillation followed by gas chromatography. The peaks that were indicated included aldehyde, ester, alcohol, carbonic acid, sulfide, thiols, disulfides, and amine groups. Gas chromatography of free amines indicated one to three individual amines according to the freshness of the sample. SW

6.34 MULTICOLOR DYEING OF TEXTILES WITH DYE PASTES CONTAINING INSOLUBILIZED DYE PARTICLES

Nagashima, Junnosuke, Hisao Hisaki, Hideo Miura, and Akira Hayakawa (Toray Industries, Inc.) (pat.)
Japan. Kokao 73 35,192 (May 23, 1973)
Chemical Abstracts 80, No. 26, 146928g (July 1, 1974)

7.81 (7.44)

Results of tests on a variety of waste waters, effluents, and sewage indicate that the probe can be used under laboratory conditions to measure the discrete free and saline ammoniacal nitrogen present. Determination can be made within a precision of 4% for levels greater than 0.4 mg/l and within 0.015 mg/l for levels less than 0.4 mg/l. Chlorine as chloramines can interfere with the readings, but use of sodium thiosulfate can dechlorinate the samples. The probe can be used to determine albuminoid nitrogen by calculating the difference between ammoniacal nitrogen and the total free ammoniacal plus albuminoid nitrogen obtained after distillation from alkaline permanganate.
[8 tables, 7 references] SW

9.1 ANADROMOUS FISHES OF CALIFORNIA
(1.3)(1.25)
(1.26)

Fry, Donald H., Jr.
State of California Dept. of Fish and Game, Sacramento (1973), 111 pp.

Anadromous fish grow to maturity in the ocean and then swim into freshwater to reproduce. Salmon is the well-known example of an anadromous fish, but other unrelated forms of sea animals also exist in this manner. This booklet gives descriptions, names, and classifications of these organisms which include: the lampreys, sturgeons, shads, salmons, sea trouts, smelts, eulachon, sticklebacks, and sea bass. The booklet also gives an index of fish names, a glossary of terms, and a life history summary of the anadromous fish entering California freshwater.
SW

9.1 FISHES: GUIDELINES FOR THE BREEDING, CARE, AND
(9.6) MANAGEMENT OF LABORATORY ANIMALS

Anonymous
National Academy of Sciences, Washington, D.C., ISBN 0-309-02213-4 (1974), v + 85 pp., $5.00, paperbound.

This report gives basic information on the sources, maintenance, and uses of fishes as experimental animals. The subjects covered include: the selection and use of fishes in the laboratory; suggestions for maintaining uniformity; and procedures for shipping live fishes, for isolation and conditioning, and for identification and control of diseases. Nutrition of fishes used in the laboratory is also discussed.
SW

9.11 SEASONAL DISTRIBUTION OF BOTTOM FISHES IN THE
NARRAGANSETT BAY AREA: SEVEN-YEAR VARIATIONS IN THE
ABUNDANCE OF WINTER FLOUNDER (PSEUDOPLEURONECTES AMERICANUS)

Jeffries, H. Perry, and William C. Johnson (Graduate School of Oceanography, University of Rhode Island, Kingston, RI 02881)
Journal of the Fisheries Research Board of Canada 31, No. 6, 1057-1066 (June 1974)

The catch of winter flounder in the Narragansett Bay area decreased 78% from 1968 to 1972. Based on observations over a 7-year period, the authors conclude that the major reduction in the abundance of the winter flounder in the area is statistically related to a seemingly insignificant trend of temperature increase. The effect may be due to larval survival; however, the thermal yearly changes are so small that higher levels of natural organization--beyond physiological responses of individuals, such as would be found in a laboratory--may be involved. When a small change in the physical environment persists over a period of several generations of the species, there results a much greater set of consequences than would be predicted from the physiological tolerances of each species involved. The authors propose that the forms that such magnifications of response may take as a result of ecosystem processes should be understood before the environment is subjected to deliberate alteration.
[7 figures, 4 tables, 17 references]
FTP

9.12 A BIBLIOGRAPHY OF FLATFISH (PLEURONECTIFORMES) RESEARCH
(9.6) WITH PARTIAL ANNOTATION

White, David B., and Robert R. Stickney (Skidaway Institute of Oceanography)
Technical Report Series No. 73-6, Georgia Marine Science Center, University System of Georgia, P.O. Box 13687, Savannah, GA 31406 (Sept. 1973), 77 pp.

This annotated bibliography contains 433 references to the literature on the flatfishes, order Pleuronectiformes. The emphasis is on papers dealing with culture procedures, physiological requirements, growth, nutrition, feeding habits, and other subjects that are of interest to scientists studying this group of fishes in the laboratory and to scientists and technologists interested in the aquaculture of Pleuronectiform fishes. The reports are listed alphabetically by author and are cross indexed by subject and by species.
FTP

9.1 LIMNOLOGY IN CANADA -- SPECIAL ISSUE PREPARED FOR THE XIX CONGRESS, INTERNATIONAL ASSOCIATION OF LIMNOLOGY (SIL)

Various authors
Journal of the Fisheries Research Board of Canada 31, No. 5, 499-1020 (May 1974)

The entire May 1974 issue of this journal is devoted to a special collection of papers on Canadian limnology. Prior to each congress of the International Association of Limnology, it has been the practice for the sponsoring country to publish a report on its progress in limnological research. The 19th triennial congress was held in August 1974 in Winnipeg, Canada. Twenty-eight papers are presented. FTP

9.1 AMPHIBIANS: GUIDELINES FOR THE BREEDING, CARE, AND MANAGEMENT OF LABORATORY ANIMALS (9.6)

Anonymous
National Academy of Sciences, Washington, D.C. (1974), ISBN 0-309-02210-X, ix + 153 pp. $5.25, paperbound.

This book is a first attempt to assemble available, practical information on the subject of amphibians. The topics covered include: classification and description of amphibians used in the laboratory; sources of experimental animals; management, facilities, and laboratory care; and records control. The focus is on the frogs and toads used by investigators in North America; some attention is given to the salamanders and newts. SW

9.1 (1.33)(9.19) GROWTH STIMULATION AND BIOCHEMICAL CHANGES IN JUVENILE COHO SALMON (ONCORHYNCHUS KISUTCH) EXPOSED TO BLEACHED KRAFT PULPMILL EFFLUENT FOR 200 DAYS

McLeay, D. J., and D. A. Brown (Division of Applied Biology, B.C. Research, Vancouver, British Columbia, Canada)
Journal of the Fisheries Research Board of Canada 31, No. 6, 1043-1049 (June 1974)

Juvenile coho salmon were exposed for 200 days to neutralized, filtered, bleached kraft mill effluent (BKME) at concentrations of 0.1 or 0.25 of the 96-h median lethal concentration (LC50) value. The length, weight, and condition factor of the fish exposed to BKME at a level of 0.25 of its 96-h LC50 value were greater than those values for control fish. Exposure of the fish to BKME at a level of 0.1 of its 96-h LC50 value did not increase these variables significantly. Further findings of decreased body protein content, slightly elevated blood sugar level, increased liver glycogen: muscle glycogen ratio, and elevated numbers of circulating neutrophils following exposure to BKME for 200 days suggest that the test fish were in a state similar to H. Selye's [Stress, Acta Inc., Montreal, Canada (1950)] stage of resistance to stress. Selye described a clinical profile for mammalian response to stress. The general adaptation syndrome consists of three stages: alarm, resistance, and exhaustion. Some of the characteristic changes in the stage of resistance are continued production of corticosteroids, stimulated metabolic rate, slightly elevated blood sugar levels, lower tissue protein levels, repletion of liver glycogen stores, continued elevation of blood neutrophils, repletion or increase in the number of circulating lymphocytes, and possibly lipogenesis.
[1 figure, 3 tables, 35 references] FTP

9.12 CONTROL OF SEX IN FISHES

Schreck, Carl B. (editor)
Publication No. VPI-SG-74-01, Sea Grant Program, Extension Division, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061 (1974), 106 pp.

An up-to-date understanding of the scope and limitations of our knowledge basic to the art of controlling the sex of fishes, in addition to its philosophical scientific interest, has pragmatic implications for fisheries management. How does a fish become male or female? How does it come to function as a male or female, or change its function from one to the other? What factors intrinsic to the fish and what factors extrinsic to the fish regulate the observed events of its reproductive processes? How can the sex of a fish be determined at will and, after it has already become differentiated as to sex, how can its reproductive function be manipulated for the benefit of human society?

The three chapters attempt to provide a concise account of the progress already made toward answering these questions, while revealing some pitfalls of oversimplification and some already obvious tasks that remain to be carried out before further progress in the areas of research concerned can be accelerated. If these accounts fall short of providing a multidimensional model of sex regulation in teleost fishes, perhaps they will at least give the researchers in various specialties a synoptic appreciation of the complex of problems of which their immediate concerns are only a part. Author's abstract

9.12 (1.84)(1.0116) THE BAY SCALLOP MAKES ITS BED OF SEAGRASS

Thayer, Gordon W. (Atlantic Estuarine Fisheries Center, National Marine Fisheries Service, NOAA, Beaufort, NC 28516), and Harvey H. Stuart
Marine Fisheries Review 36, No. 7, 27-30 (July 1974)

The bay scallop, Argopecten irradians, an important commercial organism in eight Atlantic coast states, is most often found associated with seagrass. In North Carolina there have been numerous occasions when one or more years of good scallop harvest have been followed by several years of poor harvest, the most recent being 1970-1972. Commercial dredging and trawling for scallops and fish in shallow estuaries disrupt the vegetation and bottom, and this may impede the regrowth of the grass to which larval bay scallops attach. Preliminary data are presented which show that commercial dredging does significantly decrease both scallop and grass density, and it is suggested that annual or biennial rotation of scallop harvesting techniques might increase scallop productivity.
[2 figures, 3 tables, 11 references] Authors' abstract

9.125 (1.959) ON THE COMPARATIVE ANATOMY AND FUNCTION OF THE NASAL TRACT IN ODONTOCETES (MAMMALIA, CETACEA)

Schenkkan, E. J. (Zoological Laboratory, University of Amsterdam, The Netherlands)
Bijdragen Tot de Dierkunde (Contributions to Zoology) 43, No. 2, 127-159 (1973).
Artis-Bibliotheek, Universiteit van Amsterdam, Plantage Middenlaan 45A, Amsterdam-C, The Netherlands)

There has been an increase in interest by the general public and zoologists, anatomists, and physiologists in the sounds emitted by the whales and their taxonomic allies. The sounds emitted can be of a communicative nature; other sounds have been shown to be used for "sonar" purposes in navigation and in determining range in the search for food and other purposes. An aspect of interest to investigators is the anatomical mechanism involved in the production of sound.

In this study of sound production in odontocete cetaceans (toothed whales), the author investigated the evolution of the various anatomical structures involved--from the primitive river dolphins to the more specialized pelagic dolphins. Specimens of 16 dolphins (or odontocetes) were examined in the area of the blow hole and nasal tract. The survey indicated that during the course of evolution the premaxillary sacs became progressively larger in proportion to the size of the head while the vestibular and nasofrontal sacs became smaller. The author suggests that a small amount of air required to close the blowhole is injected into the nasofrontal sacs, and during production of sound air passes from the larynx into the premaxillary sacs and back again. The site for this action is the lower posterior narial tract, and the sound is transmitted by bones forming the rostrum.

9.15 THE PRIMARY STRUCTURE OF THE TOXIN LATICAUDA SEMIFASCIATA III, A WEAK AND REVERSIBILY ACTING NEUROTOXIN FROM THE VENOM OF A SEA SNAKE, LATICAUDA SEMIFASCIATA

Maeda, Nobuyo, and Nobuo Tamiya (Dept. of Chemistry, Tohoku University, Sendai, Japan)
Biochemical Journal 141, No. 2, 389-400 (Aug. 1974)

Component LsIII, a neurotoxic protein of L. semifasciata (sea snake) venom, consists of 66 amino-acid residues and has five disulfide bridges, one of which is located between residues 26 and 30.
[2 figures, 5 tables, 43 references] FTP

9.14 (9.16) EFFECT OF VITAMIN A AND METHIONINE ON GROWTH AND AMINO ACID COMPOSITION OF BODY PROTEIN IN RAINBOW TROUT FINGERLINGS

Eckhert, Curtis D., and Arthur R. Kemmerer (Dept. of Agricultural Biochemistry, University of Arizona, Tucson, AZ 85721)
Journal of Nutrition 104, No. 7, 865-870 (July 1974)

In fish farming and in the early stages of culturing game fish, commercial feeds which provide optimum growth and body composition are needed. Other investigators of fish diets reported that high levels of vitamin A can lead to hypervitaminosis A in fish. This is manifested by decreased growth and higher levels of body fat and cholesterol. Additionally, methionine supplemented diets, containing soy protein or casein, increased plasma vitamin A levels in rats. In this present report, a study of the effects of vitamin A and methionine upon the growth rate and amino acids of fingerling rainbow trout is discussed.

Rainbow trout that had been maintained on a commercial diet were placed, in groups of five, into plastic tanks containing 20 l of water at 12.5° C. Fish in four tanks were fed a commercial diet, and fish in four tanks were fed a purified diet. Growth rates were compared over a 5-week period to ensure that the purified diet would support growth. Feeding trials were then set up with the purified diet containing three levels of vitamin A palmitate: 1,000, 2,000, and 4,000 IU per 100 g; and three levels of methionine: 500, 1,000, and 2,000 mg per 100 g. Each of the nine diets was fed to the fingerlings over a 3-week period.

9.15 (1.3) AN ANTIGENIC COMPARISON BETWEEN INFECTIOUS HEMATOPOIETIC NECROSIS VIRUS (OSV STRAIN) AND THE VIRUS OF HAEMORRHAGIC SEPTICEMIA OF RAINBOW TROUT (SALMO GAIRDNERI) (DENMARK STRAIN) BY CROSS NEUTRALIZATION

McAllister, P. E., J. L. Fryer, and K. S. Pilcher (Dept. of Microbiology, Oregon State University, Corvallis, OR 97331)
Journal of Wildlife Diseases 10, No. 2, 101-103 (Apr. 1974)

Four morphologically similar viruses have been isolated from salmonid fishes: infectious hematopoietic necrosis (IHNV), Oregon sockeye salmon disease (OSV), Sacramento River chinook disease (SRCV), and the virus of hemorrhagic septicemia of rainbow trout (VHS) (Egtved virus). Investigation by other workers of the antigenic relationships between IHNV, OSV, and SRCV demonstrated that the first two were alike, and the third was closely related. These data suggested to the authors that the three viruses are strains of the same viral agent. Experiments were performed to detect an antigenic relationhsip between one of these viruses, VHS, and IHNV (OSV strain).

The IHNV tested was isolated in 1958 from young sockeye salmon in an epizootic at the Willamette River Hatchery in Oregon. The VHS (Denmark strain) was provided by the Eastern Fish Disease Laboratory, Kearneyville, W. Va. Antiserum for each virus was prepared by injecting rabbits with a virus content in the inoculum over 1×10^9 plaque-forming units per milliliter. Each antiserum was tested for virus neutralizing activity and the percent plaque neutralization for

9.14 (9.16)

There was no significant difference in weight gain between fish on the commercial or purified diets. The fish on the diets containing supplemented vitamin A and methionine were analyzed for percentage growth, dry weight, and protein, and ratio of bound amino acids to free amino acids. Diets low in methionine produced decreasing growth, as the vitamin A increased, accompanied by decreasing dry weight. The same pattern was observed in diets low in vitamin A with increasing methionine. At the highest level of vitamin A, increased percentage growth and dry weight occurred with increasing levels of methionine, but percentage protein decreased. The ratio of bound/free amino acids was depressed by increasing either the vitamin A level to 2,000 or 4,000 IU/100 g of diet at a methionine level of 500 mg/100 g, or by increasing the methionine level to 1,000 or 2,000 mg/100 g at a vitamin A level of 1,000 IU/100 g. The decrease in the ratio was due to a large increase in free amino acids while the bound amino acids increased slightly. The authors suggest that the results of these feeding trials indicate that rations for young trout should be balanced in the content of methionine and vitamin A to maintain proper growth and amino-acid metabolism.
[5 tables, 15 references]

SW

9.15 (1.3)

each antiserum was calculated. The results of the tests indicated that neutralization of IHNV or VHS did not occur on exposure to heterologous antiserum. The authors concluded that there is no serological relationship between the two viruses and that they are separate and unrelated agents.
[1 table, 9 references]

SW

9.14 FEED FORMULATION AND EVALUATION

Hastings, W. H., and L. M. Dickie (Fish Farming Exp. Stn., Bur. Sport Fish. Wildl., Stuttgart, Ark.)
Chemical Abstracts 81, No. 3, 11890p (July 22, 1974)

9.125 (1.959)

An historical review of the various, controversial theories of sound production is given. There are many illustrations in the article based upon the dissection of the nasal passage of the various specimens studied. Skull structures are shown, and the fields of projected sound in one plane are shown. A series of diagrams is presented showing the position and evolutionary diminution of the vestibular sacs in the various species identified.
[16 figures, 66 references]

SW

9.14 (9.16)(1.87) AN AUTOMATIC FEEDING DEVICE AND THE USE OF LIVE AND FROZEN ARTEMIA FOR CULTURING LARVAL STAGES OF THE AMERICAN LOBSTER, HOMARUS AMERICANUS

Serfling, Steven A., Jon C. Van Olst, and Richard F. Ford (Dept. of Biology, California State University, San Diego, Calif.)
Aquaculture 3, No. 3, 311-314 (June 1974)

Cannibalism among lobster larvae can be eliminated if the number of food organisms, such as Artemia salina, are greater than the number of larvae, preferably by a factor of two. In a culture system containing large densities of lobster larvae, a large amount of Artemia is required. In this situation, there is a tendency for frozen Artemia to clog the tank overflow screen and cause an overflow. This can result in a loss of lobster larvae. The screen must be cleaned several times a day to prevent clogging. Reducing the amount of Artemia fed at one time can reduce the clogging but may increase the cannibalism by the lobster larvae. Live Artemia can swim away from the overflow screen, and their use as food for lobster larvae can prevent clogging. However, live adult Artemia are not available in most areas or during certain seasons. Therefore, an efficient method for dispensing frozen Artemia frequently (in amounts small enough to prevent clogging the overflow screen) is desirable.

An automatic feeding device was developed for feeding a variety of food items to larval stages of lobster and other forms. The feeder consists of a row of cups which are sequentially tipped, and emptied of their contents, into the culture tank by a revolving tripping bar driven by a clock motor. The interval of time between tipping the cups and the amount of food in each cup are adjustable as required. A diagram of the feeder is included.
[1 figure, 2 references]

SW

9.15 THE ISOLATION OF AN EASILY REVERSIBLE POST-SYNAPTIC TOXIN FROM THE VENOM OF A SEA SNAKE, LATICAUDA SEMIFASCIATA

Maeda, Nobuyo, Kenji Takagi, and Nobuo Tamiya (Dept. of Chemistry, Tohoku University, Sendai, Japan), Yun-Ming Chen, and Chen-Yuan Lee (Pharmacological Institute, College of Medicine, National Taiwan University, Taipei, Taiwan, Republic of China)
Biochemical Journal 161, No. 2, 383-387 (Aug. 1974)

In earlier work, three neurotoxins, erabutoxins a, b, and c, were isolated and sequenced from the venom of the sea snake; more than 95% of the lethal activity of the venom was ascribed to these toxins. In the present study, a new lesstoxic component was isolated from the venom. The report is a description of the isolation and some properties of this new component, which was termed Laticauda semifasciata III (component LsIII).
[5 figures, 1 table, 21 references]

PTP

9.16 INFLUENCE OF SALINITY ON PROTEIN REQUIREMENTS OF COHO SALMON (ONCORHYNCHUS KISUTCH) SMOLTS

Zeitoun, Ibrahim H., Duane E. Ullrey, John E. Halver, Peter I. Tack, and W. T. Magee (Dept. of Fisheries and Wildlife, Michigan State University, East Lansing, MI 48824)
Journal of the Fisheries Research Board of Canada 31, No. 6, 1145-1148 (June 1974)

The influence of water salinities of 10 ‰ and 20 ‰ on the minimum protein requirements of coho salmon smolts was determined. Six purified diets having from 30% to 55% protein in 5% increments were fed for 10 weeks to groups of coho salmon smolts held at 10 ‰ or 20 ‰ salinity. The minimum protein requirements did not differ for the fish at the two salinities; the weight gain and protein retention leveled off at 40% protein in the diet. Salinity level had only a minor effect on the criteria measured, but the dietary protein levels were of major consequence. The protein efficiency ratio of the casein diet with 40% protein was 2.20±0.11; the apparent net protein utilization at the same protein level was 36.1±1.8. A calorie:protein ratio of 98 was optimum for the coho salmon smolts to achieve their growth potential in the environments studied.
[2 figures, 2 tables, 9 references] FTP

9.16 (1.81) ADVANTAGES IN TRAY CULTIVATION OF PACIFIC OYSTERS (CRASSOSTREA GIGAS) IN STRANGFORD LOUGH, N. IRELAND

Parsons, Jasper (Fisheries Research Laboratory, The Cutts, Coleraine, North Ireland)
Aquaculture 3, No. 3, 221-229 (June 1974)

The traditional method of cultivating oysters in Europe involves planting thumbnail-sized seed oysters on specially prepared areas of the seabed. Elsewhere in the world, rafts and other methods of holding the oysters off the sea bottom are used. The advantages of off-bottom cultivation include: (1) the entire water column is used, increasing the yield per unit area up to 10 times; (2) a faster growth rate is achieved; (3) a better quality of oyster meat is yielded; and (4) a higher survival rate results due to lack of predation.

Experiments were carried out to determine (1) the suitability of seabed oyster cultivation and (2) the size at which oyster seed should be transferred from rafts. The mortality of oysters larger than 0.5 g enclosed in trays varied from 0.5% to 2.0% annually. Seed oysters laid on the seabed had high mortality due to shore crabs. Shore crabs of carapace widths 68-75 mm ate oysters up to 10 g in weight. Thus, oysters less than 10 g in weight needed protection by growing them in rafts or in enclosed trays. Other experiments were performed to determine optimum density and depth for growth. Oysters were laid on the seabed, suspended from a raft, or in trays intertidally or sublittorally. Densities of 200,400, and 600 oysters per square meter were used. After a 6-week period, oysters suspended from a raft showed a faster growth rate than all the other methods except for the high-density group grown sublittorally on a tray. Sublittoral growth was superior, in all cases, to that in the intertidal area. Oysters held off the seabed were

9.16 (1.93) TURTLE LIVESTOCK CULTURE: A NEW FOOD TECHNOLOGY

Anonymous
Food Engineering 46, No. 7, 58-59 (July 1974)

Mariculture, Ltd., Grand Cayman Island, British West Indies, was organized to farm turtles commercially in 1969. The island of Grand Cayman lies in the Caribbean Sea due south of Cuba and north of the turtle nesting beaches of Costa Rica. After successfully developing methods for culturing the turtle, the company has achieved $1 million in sales, and it has projected annual profits of $10 million by 1980.

The green turtle (Chelonia mydas) was selected for the aquaculture operations. It takes about 3 years to reach about 100 lb, and then is slaughtered. Almost all the parts are used in valuable byproducts which include: meat products, fat/oil, soup products, leather products, and shell products. The protein, fat, and caloric content of turtle steak is as follows: 23%, 0.2%, and 102 calories per 100 g, respectively. The oil of turtle resembles whale oil and is used by the cosmetics industry; the leather may be a competitor of crocodile skin.

The initial intent of Mariculture, Ltd., was to gather fertilized eggs from the nesting beaches on Costa Rica and Ascension Island (with permission of the governments concerned) and incubate them in a controlled environment. With an expected hatching yield of 90%, over 1% of the young turtles would be returned to the sea for conservation of the stock. By 1973 over 3,400 turtles had been released. In prototype farm arrangements, 30,000 young turtles were raised in sea

9.16 MARKING FISHES AND INVERTEBRATES. I. STATE OF THE ART OF FISH BRANDING

Raymond, Howard L. (Northwest Fisheries Center, National Marine Fisheries Service, NOAA, Seattle, WA 98112)
Marine Fisheries Review 36, No. 7, 1-6 (July 1974)

Methods of marking fish include fin clipping, external tagging, tattooing, tetracycline injection, coded-wire tagging, and hot and cold branding. None of these methods has been entirely successful. Most experiments with Pacific salmon and steelhead trout have involved the use of clipped fins as a means of identifying fish. The advantages of this method are permanence, ease of identification, and low cost. The disadvantages are high mortality on clipping combinations of fins such as pectoral and maxillary fin, fin regeneration, and limited number of combinations that can be used. External tags such as spaghetti and dart tags are useful for limited periods on small numbers of fish. Tattooing has the same limitations. The coded-wire system has the advantage of providing an unlimited amount of experimental groups that can be identified; however, the initial equipment cost is high, tagging and detection equipment can malfunction, and tags can be lost. Marking with a laser beam is expensive and the method has been disappointing. Cold branding has often been used with erratic results. More research is needed to determine the best method for tagging fish.
[4 figures, 1 table, 16 references] SW

9.16 (1.81)

larger than those laid on the seabed. Wet and dry meat weights were significantly greater by 48% and 76%, respectively, in oysters held in trays than in oysters grown on the bottom.

The trays are about 2.4×0.9 m and made from treated lumber 3×3/4 inch in size. The trays have three partitions with a total growing surface of 2.1 square meters. The trays are supported off the seabed by horizontal bearers and secured to the bearers by large rubber bands. The trays with oysters can be quickly removed on the low spring tide. The author suggests that this type of oyster cultivation is economically feasible. In addition, because the oysters are grown in high densities, less than 30 trays containing 1 ton of marketable oysters can be removed and stacked on the low tide and collected by barge on the rising tide. This avoids the labor involved in collecting oysters by hand in intertidal bottom culture and the losses caused by dredging on a muddy substrate.
[6 tables, 6 references] SW

9.16 APPARATUS FOR RAISING AND HARVESTING FISH

Gross, William R. (El Dorado, Kans., U.S.A.) (pat.)
Canadian Patent 950,286
Patent Office Record (Canada) 102, No. 27, 29 (July 2, 1974)

This apparatus is used for raising and harvesting fish in a confined body of water forming a closed loop. A paddle wheel creates an artificial current in the water to induce the fish to swim against the current. FTP

9.16 MARKING FISHES AND INVERTEBRATES. IV. A NONPERMANENT TAG FOR KING CRABS, PARALITHODES CAMTSCHATICA, AND TANNER CRABS, CHIONOECETES BAIRDI

Meyer, Robert M. (Northwest Fisheries Center, National Marine Fisheries Service, NOAA, Seattle, WA 98112)
Marine Fisheries Review 36, No. 7, 14-16 (July 1974)

There is a need for an easily applied, short-term tag for marking king crabs and Tanner crabs. A Floy anchor tag system was evaluated using 72 king crabs held in two 6- by 6-ft king crab pots and two Tanner crabs held in an aquarium. Tags were easily applied even under severe weather conditions and were retained up to 125 days. Damage to the animals was minimal as indicated by autopsies, showing the tag isolated between the carapace and underlying tissues.
[2 figures, 1 table, 4 references] Reprinted in part

9.16 AN EXPERIMENTAL ARTIFICIAL REEF IN HUMBOLDT BAY, CALIFORNIA

Dewees, Christopher M. (University of California, Davis), and Daniel W. Gotshall (California Dept. of Fish and Game)
California Fish and Game 60, No. 3, 109-127 (July 1974)

In the fall of 1968 an artificial reef was constructed of used truck tires in the Southport Channel of Humboldt Bay, Calif., to test the use of tires as habitat for reef-dwelling fishes and to establish a new sport fishery in the bay. Floral and faunal species composition and relative abundance were determined and fishing success was measured on the artificial reef.

The artificial reef apparently attracted a "rocky habitat fish fauna." Juvenile rockfish and greenling, rather than the adults, were attracted to the reef, and, as far as was known, these fish did not move away from the reef. Black rockfish were caught during the summer and early fall only; the copper rockfish and kelp greenling were captured throughout the year. During periods of heavy tidal flow or extremely turbid water the reef fishes were less vulnerable to hook and line gear. The best fishing was from May to October. The authors conclude that old tires can be used successfully as reef building material.
[6 figures, 9 tables, 15 references] FTP

9.16 (1.93)

pens in 1970. Land-based farm operations began on the island, and in 1973, 100,000 turtles, at all stages of development, were held in controlled environment pens. Furthermore, about 60 turtles per day were being processed for market. A major event occurred in the same year when turtles were induced to breed in captivity. Artificial nesting areas were prepared and fertilized eggs were deposited in them by the females. Successful breeding in captivity makes possible the application of selective genetics to improve the characteristics of the turtle with regard to faster growth, higher yields of meat, resistance to disease, and others.

The farm occupies 6½ acres of seaside land and includes 123 concrete tanks and a 1-million-gallon breeding pond with adjacent nesting beach. A central pumping system flushes 2.6 million gallons of fresh seawater through the area every hour. In a shop on the farm, turtle shells are worked into ornaments and jewelry by local girls. The fat is packed in casks and sent to refineries for processing. A large portion of the company's funds are applied to research into nutrition, health, and genetics of turtles, and other mariculture projects. A British turtle soup canner has introduced turtle steak and stew into the European market; the operation will be supplied by the aquaculture operations on Grand Cayman Island.
[3 photographs] SW

9.16 (1.0154) PROCEEDINGS OF THE FIRST U.S.-JAPAN MEETING ON AQUACULTURE AT TOKYO, JAPAN, OCTOBER 18-19, 1971

Shaw, William N. (editor) (Middle Atlantic Coastal Fisheries Center, National Marine Fisheries Service, NOAA, Oxford, MD 21654)
NOAA Technical Report NMFS CIRC-388, National Marine Fisheries Service, Seattle, Wash. (Feb. 1974), iii + 133 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

The meeting was held by the Aquaculture Panel, United States-Japan Cooperative Program in Natural Resources. Five papers were presented by the Japanese members. The subjects include (1) status of cultivation and propagation work in Hokkaido; (2) cultivation of seaweeds in Japan; (3) freshwater fish culture in Japan; (4) the status of shellfish culture in Japan; and (5) the constraints on fish farming in Japan. Six papers were presented by the U.S. panel members. the topics include (1) culture of larval penaeid shrimp at the Galveston Biological Laboratory (National Marine Fisheries Service); (2) the National Sea Grant Program and aquaculture; (3) mollusk aquaculture on the Atlantic and Gulf coasts of the United States; (4) freshwater fish culture in the United States; (5) genetics of the oyster Crassostrea virginica Gmelin; and (6) developments in shellfish culture on the U.S. Pacific coast.

U.S. panel members prepared six overview papers based upon their field trips in Japan. The topics include (1) seaweed culture, (2) freshwater fish culture, (3) shellfish culture, (4) crustacean culture, (5) marine fish culture, and (6) impressions regarding genetics and fisheries. SW

9.17 (9.2)(9.3) THE BENEFITS OF FISHERIES REGULATION: A CASE STUDY OF THE NEW ENGLAND YELLOWTAIL FLOUNDER FISHERY

Gates, John M., and Virgil J. Norton
Marine Technical Report No. 21, University of Rhode Island, Marine Advisory Service, Narragansett Bay, RI 02882 (1974), 35 pp.

The yellowtail flounder fishery accounts for over half the landed weight and value of finfish in the New England region: 72 million pounds in 1972, valued at over $10 million. The total domestic landings of yellowtail flounder have been increasing since 1954. Before that year a decline occurred from a 1942 high of 68.6 million pounds to a 1954 low of 12.8 million pounds. By 1963 the catch increased to about 83 million pounds, but some decline has occurred since then. The 1968-72 landings remained higher than the 1940-1961 levels. New England yellowtail flounder landings account for most of the U.S. catch, and New Bedford, Mass., is the primary port for receiving the catch.

Commercial fishing in the United States is generally characterized by marginal or breakeven operations. In this condition, acquiring new capital and technology, and attracting young fishermen, are difficult. As a consequence, the U.S. fishing fleet generally consists of old, inefficient, uneconomic vessels operated by older fishermen who receive relatively low earnings. There is a recognized need to improve this situation through an effective management program. The impact of controlling the level of domestic and foreign fishing effort and mesh size on the yellowtail flounder fishery was evaluated. The evaluation was performed to provide an insight into the potential economic benefits of an effective management program. The yellowtail flounder fishery was selected for the study because

9.17 CORAL TRANSPLANTATION: A METHOD TO CREATE, PRESERVE, AND MANAGE CORAL REEFS

Maragos, James E.
Sea Grant Advisory Report UNIHI-SEAGRANT-AR-74-03 COMAR-14, University of Hawaii, Honolulu, Hawaii (Apr. 1974), vi + 30 pp.

Coral reefs consist of coral skeletons and other biogenic carbonate remains which have been cemented together to form rigid structures. They are important natural resources because they act as natural breakwaters, provide habitats for many types of organisms including commercially important fish and shellfish, and serve as recreational areas. In recent years, urbanization and other activities of man have accelerated the destruction and pollution of certain coral reefs. Coral reefs are sensitive to manmade stresses, and damaged reefs may take decades to recover.

Reef communities, destroyed by floods or other catastrophes, may totally recover within 30 to 50 years. It seems that corals delay settlement on new substrates for up to one or more years, awaiting proper conditioning of the substrates by algae or other substances. In this study, the author considered the feasibility of using transplanted corals to shorten recovery time and to create new coral reefs. The corals Porites compressa and Montipora verrucosa (common species around Hawaii) were transplanted in three areas of Kaneohe Bay, Oahu, and were monitored for growth and survival over an 18-month period. Also, the natural rates of recovery of coral over a period of 34 years in Kaneohe Bay were also observed.

9.19 SUCCESSION IN BENTHIC MACROFAUNA IN A SWEDISH FJORD SUBSEQUENT TO THE CLOSURE OF A SULPHITE PULP MILL

Rosenberg, Rutger (Swedish Water and Air Pollution Research Laboratory, Gothenburg, Sweden)
Oikos Acta Oecologica Scandinavica 24, No. 2, 244-258 (1973) (Copenhagen, Denmark)

The benthic microfauna in Saltkällefjord was investigated by another worker in 1932 and the data from that work was the basis for comparison of the faunal changes that have occurred since then. Saltkällefjord is located in the larger Gullmarsfjord on the west coast of Sweden. The environment of the fjord was disturbed in the 1960's by the effluents from a sulfite pulp mill in a river emptying into the fjord. Other workers reported on the decline of the benthic organisms in the fjord during the years of mill operation. In 1966, production of pulp was terminated. In a previous paper, the author described the early phases of the recovery of the fauna in the fjord: 3 years after termination of mill production an enormous increase in numbers and species occurred; the following year, the number of species was increasing but the number of individuals seemed to have stabilized. In this present paper, a continuation of the recovery process in the fauna of the fjord is described. The recovery process is a succession where different communities replace one another in response to modification of the environment. A successful comparison was made between the fauna found in 1971-72 and that reported in 1932 to confirm the stability of the recovered faunal communities in the fjord. Polychaetes (segmented worms) dominated the early stages by number and weight. Echinoderms (sea urchins, sea cucumbers)

9.17

The larger transplanted colonies seem to grow more rapidly (increase in surface area) and to survive longer than smaller colonies of the same species. Large colonies, however, are too difficult to handle and too expensive to transplant. Under certain conditions, the coral transplants need not be attached to stationary objects; this would tend to lower the cost of transplant operations. Although this study demonstrated the feasibility of coral transplantation, further work is necessary to determine under what physical conditions. time spans, and distances natural coral recovery will occur. The possibility of introducing new species (to Hawaii) should also be considered.
[16 figures, 2 tables, 18 references] FTP

9.16 (9.19) AQUACULTURE STRUCTURE AND METHOD

Kuehn, Arthur C. (1561 W. George Washington Blvd., Davenport IA 52804), and Richard M. Kuebler (1427-23d St., Bettendorf, IA 52722) (pat.)
U.S. Patent 3,822,504 (July 9, 1974)

The structure of each aquaculture housing pod covers about 150 acres and comprises a column and cable system supporting overhead sprinklers for discharge on hydroponic beds contained under the pod structure. The method involves discharging hot water from a powerplant cooling system into a holding and distribution reservoir. Water is withdrawn from the reservoir and passed through aqueducts to the sprinkler system of the housing pod. Excess cool water is collected from the housing pod and returned to a neutral temperature reservoir before it is either recycled to the power plant or discharged into the environment. SW

9.17 (1.953) AERIAL CENSUS OF GRAY WHALES IN BAJA CALIFORNIA LAGOONS, 1970 AND 1973, WITH NOTES ON BEHAVIOR, MORTALITY AND CONSERVATION

Gard, Richard (School of Forestry and Conservation, University of California, Berkeley, CA 94720)
California Fish and Game 60, No. 3, 132-134 (July 1974)

The California gray whales spend the summer at feeding grounds in the Bering Sea and return each winter to lagoons of Baja California, Mexico, where they calve and mate. Aerial counts and observations were made on four wintering grounds in 1970 and 1973; the last published census was in 1964. The number of whales on the wintering grounds did not change appreciably from 1964 to 1973, but there was a shift in local distribution. It appears that commercial boating activity affects the abundance of whales. In the conservation of the whales, the author proposed: (1) strict regulation of boating activity on the whale calving grounds in the winter, (2) adding two lagoons, Guerrero Negro and San Ignacio, to the present whale refuge (Scammon Lagoon), and (3) an annual assessment of the abundance and distribution of the gray whales on their wintering grounds.
[5 figures, 1 table, 10 references] FTP

9.19

reoccurred in later stages; a former dominant species in the fjord, Amphiura filiformis (a brittle star), became established in later stages. The overall view of the recovery of the benthic fauna is that a terminal phase of succession was approached in about 5 years following termination of mill operations. The faunal succession showed a pattern similar to population growth curves. A number of species were abundant in environmentally unstable, shallow waters before and after the mill was shut down. The author suggests that the ability to resist pollution appears to be greater in organisms accustomed to physiological stress.
[14 figures, 1 table, 39 references] MS

9.19 (8.42) NOTE ON THE COPPER CONTENT OF OYSTERS (CRASSOSTREA ANGULATA) ALONG THE HUELVA COAST

Establlier, Rafael (Laboratorio del Inst. de Investigaciones Pesqueras, Puerto Pesquero, Cádiz, Spain)
Investigación Pesquera 36, No. 2, 293-296 (Sept. 1972)

The copper content of oysters obtained off the coast of Huelva, Gulf of Cádiz, ranged from 4.85 to 165.7 mg/100 g on the wet basis, with an average of 144.9 mg/100 g.
[1 figure, 1 table, 4 references] FTP

9.17 (9.2)(9.3)

of its importance to New England; in addition, it was believed to be overfished. A close approximation of the yellowtail flounder fishery was developed in the form of a "base model"; this was influenced by biological and economic characteristics of the fishery. The authors suggest that new ground was broken in the study by integrating the effects of fishing effort on landings, fish size, ex-vessel price, and processing yields.

The study also showed the relationship of mesh regulation and fishing effort limitation with increased yields, decreasing costs, increasing profits, increased fish size in the catch, increased processing yields, and increasing ex-vessel price to fishermen.

The results of the study showed that free entry into the fishery causes substantial economic waste. To counteract free entry, the authors suggest that limiting the number of vessels in the fishery, with compensation for those excluded, could be profitable to the industry. Additionally, limiting fishing effort to a level below the maximum sustainable yield would reduce the economic waste. In the absence of fishing effort limitations, foreign and domestic, the U.S. fishing industry will, increasingly, be a marginal economic venture. SW

9.19 (9.3) EFFECTS OF OIL ON MARINE ECOSYSTEMS: A REVIEW FOR ADMINISTRATORS AND POLICY MAKERS

Evans, Dale R. (Alaska Region, National Marine Fisheries Service, NOAA, Juneau, AK 99801), and Stanley D. Rice
Fishery Bulletin 72, No. 3, 625-638 (July 1974)

A broad selection of recent literature on the effects of oil on marine ecosystems is reviewed. The focus is on studies on crude oil, and the results are discussed with the purpose of providing a summary of findings that will be a useful reference for administrators and policy makers involved in decisions concerning petroleum developments and related activities.

Although crude oil generally should be considered toxic to marine organisms and harmful to their environment, most ecosystems can tolerate some pollution because oil can be dissipated or removed by processes like evaporation, autoxidation, dilution, and biodegradation. However, each organism and environment has a limit to how much oil can be absorbed and metabolized. Catastrophic spills are obviously pollution at a level that ecosystems cannot tolerate without damage. However, if the spills are not continued, the oil will slowly be removed and recovery of the area, at least to some degree, will likely occur. There is some evidence for recovery of some affected individuals.

Assessments of the impact of oil pollution cannot depend solely on evaluation of immediate kills of organisms from acute exposures. Chronic low-level oil pollution can cause subtle changes in organisms and is potentially more dangerous to

9.19 (6.13) WASTEWATER TREATMENT IN FISH PROCESSING

Stuiber, David A., and John T. Quigley (Dept. of Food Science and Dept. of Engineering, University of Wisconsin, Madison, Wis.)
Report No. WIS-SG-74-345, University of Wisconsin, Madison, Wis. (n.d.) pp. 958-966

This article is from the Proceedings of the Sixteenth Conference on Great Lakes Research, April 1973, held by the International Association for Great Lakes Research. The results of an investigation of a commercial fish-processing operation on Lake Michigan indicated that large volumes of waste water, resulting from converting alewives into fish meal, were being inadequately treated in a lagoon system. The wastewater problem was studied from two aspects: (1) inplant practices to determine whether more oil and solids could be recovered in the waste water before discharge, and (2) treatment of the wastewater effluent to determine whether improvements could be made to reduce chemical and biochemical oxygen demand (COD, BOD, respectively).

Stickwater resulting from the unmodified fish-processing operation was heated to 185° C, centrifuged to remove oil, and discharged for wastewater treatment. To increase suspended solids removal (and product recovery), coagulation of the stickwater with glutaric dialdehyde, at elevated temperature and low pH, appeared to be an effective, economical, additional processing step. Coagulation with lime was also studied on a laboratory scale. The use of either glutaric dialdehyde or lime in the coagulation process was subjected to cost analysis with results that were generally comparable.

9.19 IMPORTANCE OF FEED AS AN UNAVOIDABLE SOURCE OF PESTICIDE CONTAMINATION IN POULTRY MEAT AND EGGS 1. RESIDUES IN FEEDSTUFFS

Waldron, A. C., and E. C. Naber (Pesticide Analytical Laboratory, Cooperative Extension Service, Dept. of Entomology and Dept. of Poultry Science, Ohio State University, Columbus, OH 43210)
Poultry Science 53, No. 4, 1359-1371 (July 1974)

The use of pesticides in crop protection raises the possibility of feedstuff contamination and consequent exposure of poultry to these chemicals. Certain pesticides such as some chlorinated hydrocarbons, are retained and stored in body fat tissues, and the possibility exists for contamination of poultry tissues and of eggs. Information is thus needed on (1) the level of pesticide residues naturally occurring in poultry feed ingredients over which the poultry producer has no control and (2) the transfer of pesticide residues to poultry meat and eggs when raised on such feeds. It will then be necessary to establish a realistic tolerance level for certain pesticides in poultry products and feedstuffs that will protect the poultry producer and at the same time not be of concern in the human diet. The present work was carried out to establish the residue levels of certain organochlorine pesticides in various poultry feedstuffs. Corn meal, soybean meal, alfalfa meal, fish meal, and fat samples (a total of 1,162) were collected and submitted bimonthly for analyses from Maine, Georgia, Texas, Ohio, and California. The samples were analyzed for aldrin, dieldrin, heptachlor, heptachlor oxide, lindane, DDE, DDD, o,p-DDT, p,p'-DDT, and methoxychlor.

9.19 (1.37) ACCUMULATION OF DIETARY POLYCHLORINATED BIPHENYLS (AROCLOR 1254) BY RAINBOW TROUT (SALMO GAIRDNERI)

Lieb, Andrew J., Donald D. Bills, and Russel O. Sinnhuber (Dept. of Food Science and Technology, Oregon State University, Corvallis, OR 97331)
Journal of Agricultural and Food Chemistry 22, No. 4, 638-642 (July-Aug. 1974)

Polychlorinated biphenyls (PCB's) are industrial chemicals that are widely distributed in the environment. This class of chemicals is persistent in the environment and accumulates in the food chain as do the organochlorine pesticides. Of the many species of fish and wildlife with accumulations of PCB's, those used for human consumption and animal feed are important because of possible adverse effects. This study was carried out to follow the accumulation of PCB's in rainbow trout and to determine any resulting adverse effects.

A semisynthetic diet in pellet form was fed to rainbow trout. PCB's were added to the salmon oil in the diet at a level of 15 p/m. At the start of the feeding trial, the trout were 14 weeks old. The PCB diet was fed to 240 fish, and 160 fish were maintained on the PCB-free control diet. Samples of fish were taken every 4 weeks for 32 weeks, and then feeding was stopped. After 8 weeks of starvation, fish that had been on the diet containing PCB's were analyzed. The fish were homogenized, the lipids were extracted, and the PCB's were recovered from the lipids by cleanup procedures and gas chromatography. The liver, gills, stomach, muscle, and viscera were removed and examined for pathology and PCB's content.

9.19

There were general and broad occurrences of minute organochlorine pesticide residues indicated in feedstuffs used in poultry feeds in the United States. The level of individual pesticides, when they occurred, were generally in the range of 10 to 50 ppb, although higher levels did occur (0.1% of the feedstuffs exceeded 500 ppb of any of the 10 pesticides). DDT and its metabolites occurred most frequently of the organochlorine pesticides detected. The highest level and frequency of residues detected were with fishmeal and fat samples. The occurrence of residues in corn meal and soybean meal were generally infrequent and at low levels. The presence of pesticide residues in the feedstuffs was closely correlated with the areas of high crop production (thus in areas of greater pesticide use). These data indicate that contamination of poultry by way of their normal food supply may not be grounds for excessive concern relative to pesticide residues in poultry products.

The authors indicate that the evaluation of the significance of pesticide residue accumulation in poultry products after prolonged consumption of feed contaminated with pesticide levels indicated in this report will be the subject of a subsequent publication.

[7 tables, 20 references] FTP

9.19 (1.87)

The levels of PCB's in the lipids of trout increased rapidly for the first 8 weeks and then tended to equilibrate at 95 p/m. The control fish lipids contained less than 1 p/m background PCB's. The concentration of PCB's in the fish remained stable, but the total amount of PCB's increased as the fish grew larger. The level of PCB's remained stable in the starved fish. This indicates that trout are unable to eliminate PCB's. The liver contained the lowest level of PCB's of the tissues examined. Microscopic examination indicated that there were no pathological changes in the tissues after exposure to PCB's, and growth was not inhibited.

[6 figures, 4 tables, 25 references] SW

9.19 TREATING WASTE WATER FROM THE PROCESSING OF MARINE PRODUCTS
(6.13)(2.3) FOR RECOVERING PROTEINS AND FISH OIL

Imamura, Kaoru (Kochiwa Seisakusho Co., Ltd.) (pat.)
Japan. Kokai 73 93,158 (Dec. 3, 1973)
Chemical Abstracts 81, No. 4, 16482s (July 29, 1974)

9.19 (9.3)

the ecosystem than dramatic catastrophic spills. For this reason, the effects of chronic pollution warrant intensive study so that they will not be underestimated.

This review of information does little to simplify or ease the problems of policy makers concerned with marine production and transportation of oil and petroleum products. The weight of the evidence leaves little doubt that oil poses a serious hazard to living marine resources, that spills and chronic pollution have happened and will continue to occur, and that the interests of the marine environment are best preserved if marine transportation of oil and petroleum products is minimized. The continuing need for new sources and increased amounts of energy, however, limits many of the conservative and prudent alternatives to these hazards. Until research has provided conclusive data, policy makers must continue to rely on these interpretative judgments for much of their guidance in making decisions that can profoundly affect the well being of marine ecosystems.

[80 references] Extracted

9.19 PRESENCE OF ANIONIC DETERGENT RESIDUES IN SPECIMENS OF
(2.0) FISH AND SHELLFISH PURCHASED ON THE OPEN MARKET

Bellassai, S., and S. Sciacca (Ist. Ig., Univ. Catania, Catania, Italy)
Chemical Abstracts 81, No. 3, 10243t (July 22, 1974)

9.19 (6.13)

The wastewater effluent resulting from coagulation by either glutaric dialdehyde or lime had about the same COD and BOD. Studies on treating the wastewater effluent resulted in a design that used two anaerobic lagoons for pretreatment. This was followed by a final treatment, under aerobic conditions, in two lagoons and a polishing pond where the effluent could be held for 30 days. In this pond, suspended solids would be reduced to 50 mg/l and the COD would be 250 mg/l.

The two-stage treatment plant cost per year was estimated to be $12,000 which would be offset by the increased income from the higher recovery of protein solids from the stickwater.

[5 figures, 3 tables, 3 references] SW

9.19 TREATING WASTE WATER FROM ANIMAL-PROTEIN PROCESSING

Uemori, Eiji, and Katsuyuki Taketomo (Ryoka Seisakusho Co., Ltd.) (pat.)
Japan. Kokai 73 89,876 (Nov. 24, 1973)
Chemical Abstracts 81, No. 2, 6113h (July 15, 1974)

9.19 BIOLOGICAL BEHAVIOR OF SOME SOAP-BASED DETERGENTS

Maurer, E. W., T. C. Cordon, J. K. Weil, and W. M. Linfield (Eastern Regional Research Center, Agricultural Research Service, Philadelphia, PA 19118)
Journal of the American Oil Chemists' Society 51, No. 7, 287-291 (July 1974)

Soap made from tallow is an excellent detergent in soft or moderately hard water. Because such a soap is precipitated in the presence of calcium and magnesium ions, its usefulness is limited in hard water. In earlier work in the authors' laboratory, phosphate free, soap-based detergents were formulated with tallow soap to which lime soap dispersing agents had been added. Inorganic builders, such as glassy sodium silicates, when added to the formulation enhanced its detergency characteristic. These soap-based formulations had detergency properties comparable to those of phosphate-built commercial detergents in a wide range of water hardness and temperature. The purpose of those investigations was to promote environmental safety presumably with regard to reducing the amount of phosphates discharged in washwater and increasing its biodegradability. In this present investigation, the biodegradability of tallow soap, three soap-based detergent formulations, and their lime soap dispersing agents (LSDA) was determined under aerobic and microaerophilic conditions. The LSDA tested were sodium methyl α-sulfotallowate, sulfated N-(2-hydroxypropyl) tallowamide, and sodium N-methyl N-(2-sulfoethyl) tallowamide. Sewage and river water microorganisms were used as the inocula. The stages of biodegradation were detected by loss of carbon and methylene blue active substance and by increase in turbidity and surface tension of the water. A decrease in carbon content of the degrading solutions occurred

9.19 OCEANIC DISTRIBUTION OF LOW-MOLECULAR-WEIGHT HYDROCARBONS BASELINE MEASUREMENTS

Swinnerton, John W., and Robert A. Lamontagne (U.S. Naval Research Laboratory, Washington, DC 20375)
Environmental Science & Technology 8, No. 7, 657-663 (July 1974)

There is a need to determine concentrations of low-molecular-weight hydrocarbons in the oceans for baseline purposes. The extent of oil pollution can be assessed by comparison with baseline information. Measurements of light hydrocarbons in the marine environment were obtained in the Gulf of Mexico and the western Caribbean Sea; tropical North Atlantic, North Atlantic, and Arctic Oceans; Mediterranean, Black, Red, and Arabian Seas; north tropical Pacific and South Pacific Ocean. Light hydrocarbons were also measured in the Potomac and York Rivers, Chesapeake Bay, water near Miami, Fla.; several regions of anoxic water such as Lake Nitinat (Canada), Cariaco Trench, Black Sea, and hot brine in the Red Sea. Since 1966, 452 water samples collected from these areas were analyzed by techniques of gas chromatography aboard ship.

All the results of the analyses are listed in five tables by location with an accompanying map showing corresponding locations. The surface waters have low concentrations of saturated light hydrocarbons; the average level of methane in open ocean was 49.5 nanoliters per liter which was nearly in equilibrium with the atmosphere. At nearshore areas, the methane levels were over 100-fold higher than open ocean levels. Baseline levels of ethane and propane in open ocean averaged 0.50 nl per liter and 0.34 nl per liter, respectively, while nearshore samples

9.19 PLASTIC PARTICLES IN SURFACE WATERS OF THE NORTHWESTERN ATLANTIC

Colton, John B., Jr., Frederick D. Knapp (Northeast Fisheries Center, National Marine Fisheries Service, Narragansett Laboratory, Narragansett, RH 02882), and Bruce R. Burns
Science 185, No. 4150, 491-497 (Aug. 9, 1974)

In addition to other reports of plastic particles in the Sargasso Sea and off the New England coast, the authors also found plastic particles in surface samples taken in July-August 1972 over a wide area of the North Atlantic Ocean. The samples were collected in one of the ichthyoplankton surveys under the Marine Resources Monitoring, Assessment, and Prediction (MARMAP) program of the National Marine Fisheries Service. Three NOAA Research vessels participated in this survey: Albatross IV, Delaware II, and Oregon II. Samples were collected from these vessels in Gulf Stream waters between Florida and Cape Cod, the Caribbean Sea, and the Antilles area. The following types of plastic particles were collected: white, opaque, polystyrene spherules 1.0 mm mean diameter; translucent to clear, polystyrene spherules containing gaseous voids 1.5 mm mean diameter; opaque to translucent, polyethylene cylinders or disks 3.4 mm mean diameter and 2.0 mm mean thickness; pieces of styrofoam; sheets of thin flexible wrapping material; and plastic pieces of various shapes, hardness, and clarity. The sampling gear was a rectangular framed net of 0.947 mm nylon mesh; it was towed at a speed of 10 knots for 10 min in a sampling period.

Most of the styrofoam and pieces of formulated plastics (wrapping material, containers, and toys) enter the ocean through routine at-sea dumping from individual vessels. The authors suggest that clear and opaque polystyrene spherules

9.19 OLFACTORY RESPONSE AND FENITROTHION TOXICITY IN AMERICAN LOBSTERS (HOMARUS AMERICANUS)

McLeese, D. W. (Dept. of the Environment, Fisheries and Marine Service, Biological Station, St. Andrews, New Brunswick, Canada)
Journal of the Fisheries Research Board of Canada 31, No. 6, 1127-1131 (June 1974)

Fenitrothion is O-O-dimethyl O-(4-nitro-m-tolyl)phosphorothioate, an organophosphate insecticide that has been used as an aerial forest spray for spruce budworm control. In this study, tests were carried out to determine if fenitrothion, at low concentrations, affected the olfactory response of American lobsters and to determine the acute toxicity of fenitrothion to larval and adult lobsters. The olfactory response of American lobsters was determined in test runways using cod muscle extract and levels of fenitrothion ranging from 0.05 to 25.4 ppb at the time of stimulation. The olfactory response of the lobsters was not affected under these conditions.

Larval and adult lobsters are sensitive to fenitrothion; the 96-h LC50 for both is about 1 ppb of fenitrothion. The lethal threshold for larvae is about 0.015 ppb of fenitrothion, and that for adult lobsters is 0.3 ppb or lower.
[2 figures, 3 tables, 14 references] FTP

9.19

are discharged from plastic producing or processing plants into rivers or estuaries, and they eventually appear in the coastal waters of the ocean. Polyethylene cylinders also result from plastic processing and production operations, and most of these particles were found in open coastal waters of the United States. The particles were also found in the Caribbean Sea and off the coasts of Washington State and the Aleutian Islands in the Pacific Ocean; this indicates that there are other sources besides the plastics industry.

At the present levels of contamination with plastic particles in ocean waters, adverse biological conditions are minor. Tests were conducted to determine whether larval and juvenile fishes would feed on plastic spherules. No spherules were found in the digestive tracts of the organisms. Any spherules that were ingested passed through the gut without injury to the organisms.

A high proportion of the plastic material collected consisted of one-time-use wrapping and packaging wastes, and much of this material came from disposable styrofoam cups. The disposal of these materials at sea may be stopped if all vessels are required to use nonpolluting incinerators or compact all solid wastes for subsequent disposal ashore. The wide distribution of polystyrene and polyethylene particles in the estuaries and ocean suggests that improper wastewater disposal is common in the plastics industry. Strong governmental pollution control and monitoring programs are necessary to prevent improper disposal of plastic particles from that source.

[6 figures, 1 table, 13 references] SW

9.19 (8.42) ETUDIO DEL CONTENIDO EN MERCURIO DE LAS CONSERVAS DE PESCADOS Y MOLUSCOS ESPAÑOLAS
[STUDY OF THE MERCURY CONTENT OF CANNED SPANISH FISH AND MOLLUSKS]

Establier, Rafael (Laboratorio del Inst. de Invest. Pesqueras, Puerto Pesquero, Cádiz, Spain)

Technical Report No. 11, Instituto de Investigaciones Pesqueras, Barcelona, Spain (Oct. 1973), 11 pp. [In Spanish]

The median concentrations of mercury in canned fish were (in p/m): sardinas (Sardina pilchardus), 0.07; anchoas (Engraulis encrasicholus), 0.20; relanzón (Scomberesox saurus), 0.23; caballa (Scomber scomber = S. colias), 0.11; atún (Thunnus thynnus), 0.36; albacora, bonito del Norte (Thunnus alalunga), 0.26; and melva (Auxis thazard), 0.31. The median concentrations of mercury in mollusks were (in p/m): berberechos (Cardium edule), 0.25; mejillones (Mytilus edulis), 0.11; langostillos (Cardium tuberculatum), 0.13; zamburiñas (Chlamys varia), 0.15; navajas (Solen sp.), 0.14; almejas (Tapes sp.); 0.14; calamares (Loligo sp.), 0.11; and pulpos (Octopus vulgaris), 0.09.

[3 tables, 5 references] FTP

9.19

with an increase in turbidity and surface tension. After a 7-day test period, the authors concluded that the three soap formulations had been successfully biodegraded under aerobic conditions. Under microaerophilic conditions biodegradation occurred easily when sewage sludge was the inoculum; however, anaerobic organisms alone did not appear to degrade the soap preparations.

The mouse LD_{50} doses for the soap formulations being tested was about double for a commercial phosphate-built detergent. With reference to toxicity to fish, sodium tripolyphosphate in commercial detergents is less toxic than either soap or soap formulations. In rabbit tests for skin irritation, the soap formulations were mildly irritating. Solutions of soap (10%) produced slight eye irritation, and 0.1 ml dry powders produced severe irritation. No skin sensitization was produced with intracutaneous injection.

[3 figures, 8 tables, 15 references] SW

9.19

contained levels that were 100-200 times higher. Baseline levels of ethylene and propylene averaged 4.8 and 1.4 nl per liter, respectively, and the levels of these two compounds appeared to be influenced by biological productivity rather than by contamination. The authors suggest that the saturated low-molecular-weight hydrocarbons, such as methane, ethane, and propane, can serve as sensitive indicators of the presence of manmade or natural hydrocarbon pollutants; unsaturated low-molecular-weight hydrocarbons, such as ethylene and propylene, do not appear to be as sensitive.

[3 figures, 5 tables, 8 references] SW

Bielli, G., A. Di Giulio, V. Iacoponi, M. Ielmini, C. Lucertini, M. Sanna, and C. Botre (Ist. Chim. Farm., Univ. Roma, Rome, Italy)
Chemical Abstracts 81, No. 4, 16547s (July 29, 1974)

Ward, Richard J. (University of Maryland, College Park, Md.)
American Economist 18, No. 1, 82-92 (Spring 1974) [Dept. of Economics, Box 3985, University Station, Laramie, WY 82071]

The author describes the economists' approach and methodology with respect to the impact on industries of complying with environmental standards set by the government or the industries themselves. Economists apparently prefer taxes or effluent charges to direct regulation or subsidies as a device for environmental planning [R. Solow, Science (Aug. 6, 1971)]. To carry the assessment further, in this article the author describes the traditional techniques of economic firm theory that will assist in measuring the amount of tax or effluent charge that may be necessary to obtain compliance with environmental standards.

[3 figures, 2 diagrams, 8 references] FTP

9.19 MERCURY CONTENT OF THE MUSSELS (MYTILUS EDULIS) GROWING WILD [UNCULTIVATED] AND UNDER CULTIVATION IN NORTHWEST SPAIN

Establier, Rafael (Laboratorio del Inst. de Investigaciones Pesqueras, Puerto Pesquero, Cádiz, Spain)
Investigacion Pesquera 37, No. 1, 101-106 (Feb. 1973) [In Spanish, English summary]

Mussel samples from natural populations and from cultured populations were collected from four areas in northwest Spain: Ria de Vigo, Ria de Pontevedra, Ria de Arosa, and Rias de Muros y Noya. Only samples of cultivated mussels were obtained from the last area. Fourteen samples of cultivated mussels and 10 samples of wild mussels were analyzed. The mercury content of the cultivated mussels ranged from 0.06 to 0.28 p/m (wet basis); all but two of these samples showed mercury content of 0.14 or below. The mercury content of the wild (uncultivated) mussels ranged from 0.08 to 0.50 p/m. The author suggests that the generally higher level of mercury in the wild mussels reflects their slower growth rate.
[1 figure, 1 table, 1 reference]
FTP

9.19 (8.42) NEW DATA ON THE MERCURY CONTENTS IN FISH, SHELL-FISH AND CRUSTACEANS OF THE GULF OF CÁDIZ AND FISHING AREAS OFF THE COAST OF WEST AFRICA

Establier, Rafael
Investigacion Pesquera [Barcelona, Spain] 37, No. 1, 107-114 (Feb. 1973) [In Spanish, English summary]

Fifteen species of fish, two species of crustaceans, and two species of mollusks from the Gulf of Cadiz, and 19 species of fish and one species of mollusk from the coast of West Africa, were examined for their mercury content. The mercury content ranged from 0.06 to 0.95 p/m; all but one species had mercury content below 0.50 p/m; the majority of the species had mercury content below 0.3 p/m; and only one species, the melva (Auxis thazard) had a mercury content over 0.5 p/m (0.95 p/m); Values are on the wet basis.
[2 tables, 3 references]
FTP

9.19 (9.17) POTENTIAL EFFECTS OF THERMAL DISCHARGES ON AQUATIC SYSTEMS

Bush, Ronald M., Eugene B. Welch, and Brian W. Mar (Dept. of Civil Engineering, University of Washington, Seattle, WA 98195)
Environmental Science & Technology 8, No. 6, 561-568 (June 1973)

In planning to discharge heated water into a waterway, an estimate should be made of the consequences of altering the natural temperature regime. This article has been prepared as a guide to the possible effects of increased water temperature on freshwater and marine aquatic systems. The authors previously established the thermal requirements of 85 species of fish ["Potential Effects of Thermal Discharges on Aquatic Systems--Basic Data," manuscript, available through ACS Microfilm Depository Service, 1155 - 16th St., NW, Washington, DC 20036 (1972)]. In this present article, the response of freshwater anadromous fish to elevated temperatures was estimated for six river systems. The estimates are tabulated. The river systems include: the Columbia, Sacramento, upper and lower Mississippi, Tennessee, and the Delaware. The tables show the optimal and lethal temperatures for adult and juvenile fish but not for spawning and egg hatching success. Furthermore, the tables show the percent of species within a preferred temperature range, the percent of species able to survive at suboptimal temperature conditions, and the species that are expected to be lost from the river at the various higher temperatures listed. Information on freshwater invertebrates relative to thermal requirements is scarce, but consideration of these requirements for fish will result in protectirg the invertebrates. Because of the complexity of the algae

9.2 REVIEW OF FISHERIES IN OECD MEMBER COUNTRIES 1973

Anonymous
Organization for Economic Cooperation and Development, 2, rue André-Pascal, 75775 Paris CEDEX 16, France (1974), 231 pp. Price $5, £2, F20.

The members of the Organization for Economic Cooperation and Development include: Australia, Austria, Belgium, Canada, Denmark, Finland, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

A general survey, including production and distribution, of the fisheries of the member countries is presented at the beginning of the review. Many changes in the fisheries are expected to be generated by the U.N. 1974 Conference on the Law of the Sea. Government intervention to control fisheries, with regard to catching power, port facilities, financial aid, and other areas, accelerated in 1973. On catching power, the number of fishing vessels over 100 G.R.T. has been growing 6% per year. The 1973 fish catch was about the same as that of 1972. An increasing interest was shown in underutilized species for food. In financial returns for the catch, fishermen obtained substantially higher gross revenues and profits for 1973 than for 1972. Demand pressure gave the impetus for the improved returns. There has been an intensification of the conflict of interests between petroleum exploration and exploitation and the fisheries. Low supplies and high prices for fuel affected fishing boat operations. Some countries subsidized their fishing fleets relative to fuel prices. Member countries imported less fish

9.19 (1.0112) EFFECTS OF PRUDHOE BAY CRUDE OIL ON MOLTING TANNER CRABS, CHIONOECETES BAIRDI

Karinen, John F., and Stanley D. Rice (Auke Bay Fisheries Laboratory, National Marine Fisheries Service, NOAA, Auke Bay, AK 99821)
Marine Fisheries Review 36, No. 7, 31-37 (July 1974)

Premolt and postmolt juvenile male Tanner crabs from Alaska waters were exposed to Prudhoe Bay crude oil in static bioassays in the laboratory. Crabs in both stages were similarly susceptible to crude oil; the estimated 48-hour TLm (median tolerance limits) values were 0.56 ml oil/liter. Molting success decreased with increasing exposure of crabs to oil, and newly molted crabs autotomized limbs during exposure to oil. Relating the results of the study to the known behavior of crabs and the documented behavior of oil spills in the ocean suggests that oil spilled in Alaska waters would harm the Tanner crab resources. The impact on all crab resources of chronic low-level oil pollution from the ballast water discharged into Prince William Sound is unknown. This study further illustrates the present state of ignorance concerning the biological effects of oil in the marine environment.
[5 figures, 2 tables, 18 references] Authors' abstract, slightly edited

9.19 ACUTE TOXICITY OF TWENTY INSECTICIDES TO STRIPED BASS, MORONE SAXATILIS

Korn, Sid (National Marine Fisheries Service, Tiburon Fisheries Laboratory, Tiburon, CA 94920), and Russell Earnest
California Fish and Game 60, No. 3, 128-131 (July 1974)

The acute toxicity of 20 insecticides to juvenile striped bass was determined in saline water (28 ‰ to 30 ‰, depending upon the test). All bioassays were 4-day tests using proportional diluters described by D. Mount and W. Brungs [Water Research 1, 21-29 (1967)]. The toxicities of the insecticides to striped bass were as follows (expressed as Median Lethal Concentration (TL_{50}) values, µg/l): Endrin, 0.094; Endosulfan, 0.1; DDT, 0.53; Dursban, 0.58; DDD, 2.5; Heptachlor, 3; Methoxychlor, 3.3; Toxaphene, 4.4; Aldrin, 7.2; Lindane, 7.3; Chlordane, 11.8; Malathion, 14; Parathion, 17.8; Dieldrin, 19.7; E.P.N., 60; Fenthion, 453; Dibrom, 500; Methyl Parathion, 790; Carbaryl, 1,000; and Abate, 1,000.
[2 tables, 8 references] FTP

9.2

products in 1973 than in 1972; the difference was due to lack of South American fish meal. Trade in fresh and frozen fish expanded by about 8%. The trade in canned fish products remained about the same as in 1972 in quantity, but the overall value rose by more than 15%. There was a general shrinkage in the international trade in saltfish; this was due to scarcity of the right sized fish and restrictions on the catch for herring. The price of shellfish, and consumer resistance to the price, increased together; these two factors may have had some effect on the 6% reduction in the international trade in shellfish. The value of traded items, however, increased. The demand for food fish was influenced by the higher prices: per capita consumption of fish was below the 1972 level. World output of fish meal decreased for the third year; that is, it declined 14% from the 1972 level and 38% from the 1970 level. Prices of fish meal reached an unprecedented high level. Production of fish body oil, including baleen whale oil, is estimated at 690,000 tons; this is 210,000 tons below the 1972 level. The decline was due to the failure of the South American anchoveta fishery.

The major portion of the review is devoted to reports on the fisheries of the member countries. These include statistics on fishing fleets; landings by species, quantity, and value; exports; and other pertinent information. SW

9.19 (9.17)

community in an ecosystem, statements on the effects of higher temperatures can only be speculative; however, the selection preference toward blue-green algae is an advancement toward dominance by nuisance algae.

Because of the limited data on the thermal limits of marine fish and invertebrates, estimates of their response to elevated temperatures similar to those made for the freshwater organisms is not possible. As a guide for the siting of cooling water discharges in the marine environment, the estimates of W. J. North and J. R. Adams [Chesapeake Sci., 10, Nos. 3-4, 139-144 (1969)] for the Atlantic coast are the best available.
[1 figure, 7 tables, 35 references] SW

9.19 INFLUENCE OF PCB [POLYCHLORINATED BIPHENYLS] ON AQUATIC ORGANISMS. IV. CHANGES IN SERUM LIPID CONTENTS AND FORMATION OF LIPID PEROXIDE IN THE TISSUES OF CARP ADMINISTERED WITH PCB ORALLY

Ito, Yasuyuki, and Toshiro Murata (Women's Coll., Tokai Univ., Shizuoka, Japan)
Chemical Abstracts 81, No. 3, 10299r (July 22, 1974)

9.2 FINANCING FISHING VESSELS

Holmsen, Andreas A. (University of Rhode Island, Kingston, R.I.)
Marine Memorandum No. 34, Marine Advisory Service, University of Rhode Island, Narragansett Bay Campus, Narragansett, RI 02882 (1974), 8 pp.

Funds for financing the purchase of new or used vessels or for reconstruction of a vessel can be obtained through either commercial banks, the Farm Credit Administration, or the Capital Construction Fund.

The few commercial banks willing to finance vessels offer the loans through their installment credit department. In Rhode Island, the down payment required for a vessel loan is currently 10-30% on a new vessel and 40-50% on the appraised value of a used vessel. The true interest rate on a new vessel is 11-12% and 13-14% on a used one. The loan period on a new vessel is 7-10 years and 5-7 years on a used one. The Small Business Administration (SBA) guarantees fisheries loans through commercial banks. The SBA will guarantee 90% of a maximum loan of $350,000, and the bank cannot charge an interest rate that is higher than the maximum set by the SBA.

The Farm Credit Administration includes the Production Credit Association (PCA). Fishermen can borrow funds for vessels, gear, house, car, and personal needs through a PCA. The PCA offers four classes of loans based on the degree of risk: Class I, 7¼%; Class II, 8%; Class III, 8½%; and Class IV, 9%. With a 25% down payment the Class IV interest rate applies. If a fisherman wants to finance some gear or construction on his vessel, and has a fair amount of assets in real estate and no debt on his vessel, then the Class I interest rate applies. Borrowing money from a PCA requires that the borrower become a member and 10% of the

9.2 RECENT TAX DEVELOPMENTS IN COMMERCIAL FISHING

Cato, James C. (Dept. of Food Resource Economics, University of Florida, Gainesville, Fla.)
Florida Sea Grant Publication SUSF-SG-74-005, Marine Advisory Program, Florida Cooperative Extension Service, University of Florida, Gainesville, Fla. (July 1974), i + 6 pp.

This bulletin is intended to inform the commercial fishing industry of probable changes in legal requirements for withholding income and social security taxes. Additionally, the background, development, and current status of pertinent court decisions are discussed.

Commercial fishing boat owners historically have considered captains and crew members to be private contractors, rather than employees, whose income is not subject to withholding of income and social security taxes. The Internal Revenue Service (IRS) has tried, without success, to get boat owners to withhold these taxes. A change occurred in 1973 when the U.S. Supreme Court, hearing a specific case, decided that a "Maritime Test" should be applied by local courts in determining whether captains and crew members are employees or contractors. A lower court in Florida decided that the Maritime Test is an application of the decisions made under the Jones Act. The Jones Act of 1920 gave seamen the right to sue an employer for negligence. Under this law, courts have often compassionately considered fishermen to be employees rather than contractors to entitle them to compensation for injuries received on vessels. These changes in the courts have encouraged the IRS to institute new litigation in an attempt to make some of

9.2 (9.3) THE LOBSTER FISHERY OF THE MARITIME PROVINCES: ECONOMIC EFFECTS OF REGULATIONS

DeWolf, A. Gordon (Dept. of the Environment, Fisheries and Marine Service, Economics Branch, Halifax, Nova Scotia, Canada)
Bulletin 187 of the Fisheries Research Board of Canada, Fisheries Marine Service, Dept. of the Environment, Ottawa, Canada (1974), 59 pp. Canada $3.00; elsewhere $3.60. Catalog No. Fs94-187. Available from Information Canada, Ottawa K1A 0S9, Canada.

A history of the lobster fishery regulations of the Maritime Provinces is traced and evaluations are made of the biological and economic effects of the regulations. This fishery has been continuously managed for over 100 years. For most of the period, regulations were formulated that were supposed to accomplish numerous and sometimes conflicting objectives. The most consistently advanced objective was the biological concept of conservation; recent regulations have been based on economic concepts. The review of the biological concept of conservation revealed that certain regulations (prohibition of the capture of egg-bearing females and of the retention of small lobsters, and permit fishing for a short time each year) may not have achieved their objective. Conservation, as an end in itself, is not a valid fishery management objective; management goals must be related to users of a resource, the producers and consumers. In one chapter, the author discusses the theoretical economic basis of fishery management and attempts to apply the principles to the Maritimes Provinces' lobster fishery. The author concludes that regulations have led to economic inefficiencies but that some of the more recently introduced regulations (trap limits and

9.2 (9.17) FUEL CONSUMPTION AS AN INDEX OF FISHING EFFORT

Levi, D., and G. Giannetti (Laboratorio di Tecnologia della Pesca/C.N.R. Molo Mandracchio, Ancona, Italy)
In Studies and Review, No. 53, 1-17 (1973) [General Fisheries Council for the Mediterranean, Food and Agriculture Organization, Via delle Terme di Caracalla, 00100 Rome, Italy]

The possibility of using fuel consumption as an index of fishing effort exerted by trawlers in the absence of classical data on fishery stock assessments is discussed in this article. Recent attempts at stock assessment in the fisheries of the Mediterranean Sea have revealed the lack of data necessary for management. Although smaller in weight than in other areas, the annual fish catch in the Mediterranean Sea in 1972 was valued at over $500 million. For most Mediterranean fisheries the following data are generally unknown: actual time spent fishing or number of hauls; relative fishing power of different categories of vessels; distribution throughout the year of nominal effort on the various fishing grounds; and fishing effort and corresponding catch by trawler or purse seiner. In the absence of this information, other data may be available for use in the assessment of a fishery stock. Such data should fulfill two conditions: (1) the data is routinely recorded by the industry or government administration, and (2) it gives a better measure of nominal fishing effort and better information on the type and location of fishing effort than is currently available. Data on fuel consumption appeared to fulfill these criteria.

9.2

the larger fishing companies responsible for withholding the taxes of their captains and crew members.

The IRS and the courts appear to be leaning toward the interpretation that the boat owners' "right to control" the captain and crew makes the arrangement between them one of employer-employee rather than contractual. If this interpretation is followed, several actions should be considered.

1. Owners of fishing vessels may wish to begin withholding income and social security taxes to demonstrate good faith and prevent an IRS suit for payment of taxes not withheld in 1971-72-73.
2. Encourage the IRS to decide the employer-employee relationship and tax withholding questions and publish the decision in the Federal Register. This would establish a definite starting date to begin withholding taxes and exempt employers from paying taxes not withheld in previous years.
3. Keep adequate records to maintain verification of all business transactions.
4. Investigate alternative types of industry structure and organization such as partnership and leasing arrangements.
5. Cooperate through fishing industry trade associations to influence establishment of national interpretations on the questions of withholding income and social security taxes.

[8 references] SW

9.2 (9.17)

In most countries diesel fuel for fishing boats is sold duty-free, and strict control of sales is maintained. Customs agents record each new delivery, and fueling data may be found in account books and other records of individual vessels. Furthermore, a linear relationship has been shown between daily fuel costs (fuel consumption) and power of the main engine. Therefore, if there is a linear relationship between the horsepower of a group of trawlers and their fishing powers, the quantity of fuel consumed by the propulsion engines during one haul will be linearly related to the product of their fishing power and fishing effort.

Over a 5-year period, information on catch and fuel consumption of 30 trawlers operating out of Ancona, Italy, was maintained. Data on landings per boat were plotted with corresponding fuel consumption. The results of the plots indicated a straight line through the points of the equation: catch = 20.09 +0.27 tons fuel consumed; the correlation coefficient, r = 0.92, is considered to be high. These data indicated that catches are not directly proportioned to fuel consumption, but for practical purposes fuel consumption can be used as a measure of fishing effort.

The article concludes with an example of the application of fuel consumption data in the assessment of the Adriatic hake fishery.

[4 figures, 1 table, 18 references] SW

9.2

loan is received in shares of the PCA. If a fisherman borrows $100,000, he will receive $90,000 and $10,000 worth of shares; he pays interest on $100,000 but pays back $90,000 and the shares.

The old mortgage and loan insurance program, operated by the National Marine Fisheries Service, has been amended and is now called Obligation Guarantee Program. Although final rules have not been established, the program is operating under proposed rules. In this program, a fisherman can obtain a loan for 75% of the cost of building or reconstructing a vessel. Three bids on the job have to be obtained, and the lowest bid will be accepted. The loan is secured through a commercial bank. A fee of one-half percent of the amount requested plus $50 must be paid by the applicant. The time period for payments on a new vessel can be as long as 25 years.

Under the amended Merchant Marine Act, the Capital Construction Fund provides funds for new construction of vessels, reconstruction of vessels, or purchase of used vessels. In this program, an agreement is set up for a vessel owner by the Secretary of Commerce. Earnings from his current vessel, labor income as a fisherman, capital gains from sale of a vessel, or insurance settlements for his vessel are deposited into a fund. The funds deposited are not liable for income tax. The money is deposited into three accounts depending on the source: the capital account, the capital gains account, or the ordinary income account. Funds used for vessels are tax exempt. When money from the capital gains and ordinary income accounts is used to purchase or repair a vessel, a reduction in the book value of the vessel is allowed.

[2 references] SW

9.2 (9.3)

license limitation) could, if properly implemented and administered, lead to increased benefits through greater efficiency and increased returns to factors of production that have been lost because of the common property nature of the lobster fishery.

[11 illustrations, 18 figures, 17 tables, 124 references] FTP

9.2 ALASKA AND THE LAW OF THE SEA.
(9.3)(1.0112) USE OF THE SEA BY ALASKA NATIVES -- A HISTORICAL PERSPECTIVE

Josephson, Karla
Arctic Environmental Information and Data Center, University of Alaska, 707 A St., Anchorage, AK 99501 (May 1974), vii + 94 pp.

This report is part of a series of Alaska Sea Grant Reports dealing with the law of the sea from a position of state interest within the national context. This book is the first known compilation of various individual writings on the aboriginal uses of the coastal waters and marine resources of Alaska's northern seas. It was prepared with the intent that it may serve as a historical perspective of the question of dominion exercised by Alaskan people over these waters. It contains the following sections: Aleutians; Kodiak; Cook Inlet; Prince William Sound; Copper River; Southeastern Indians; Arctic Whale Hunters; Arctic Hunters and Fishermen; St. Lawrence Island, Sledge and King Islands and Cape Prince of Wales; Bering Sea Hunters and Fishermen; Salmon Fishermen; Subsistence Uses of Bering Sea Products; and Boats and Their Uses in the Bering Sea.

In her summary the author states: "The use of coastal ice and water by Alaska's Native people was remarkable--greater than their use of land in some major areas. Beyond the quantity of their use, their methods of use were exceptional. Whether it was Eskimo use of ice in the north, Aleut use of water on the chain, or Tlingit activity on the fiords in the south, lives were so centered on the water that the lines which we imagine separate land from water disappeared."
[Illustrated, 329 references, bibliography of 89 references] FTP

9.3 REPORT ON INTERNATIONAL AND NATIONAL LEGISLATION
(9.6) FOR THE CONSERVATION OF MARINE MAMMALS. PART 1.
INTERNATIONAL LEGISLATION

Savini, Michel J. (University of Nice, Nice, France)
FAO Fisheries Circular No. 326, Food and Agriculture Organization of the United Nations, Rome, Italy (June 1974), iii + 80 pp. [Distribution restricted]

This report contains background information on the nature and application of pertinent existing international legislation regarding marine mammals. The second part dealing with national legislation will be prepared and issued when the relevant documentation is received from all major countries engaged in the exploitation and harvesting of marine mammals.

Documentation for the present report was received from 49 countries. Eighteen main international bodies or conventions dealing with the conservation of mammals are covered.
[216 footnotes] FTP

9.3 BEYOND THE THREE MILE LIMIT: RECENT DEVELOPMENTS
AFFECTING THE LAW OF THE SEA

Gutteridge, Joyce A. C.
Virginia Journal of International Law 14, No. 2, 195-219 (Winter 1974)

In this article, the author addressed three questions: (1) Why is it necessary, only slightly more than 10 years after the adoption of the four Geneva Conventions of the Law of the Sea, to convene a third United Nations Conference on the Law of the Sea? (2) What preparations have been and are being made for the Conference? (3) What are the most important issues to be discussed at the Conference, and what significant trends have developed during the preparatory work? Besides the introduction, the main sections of the report include: Factors Leading to a Demand for a Revision of the Law of the Sea; From Sea-Bed Committee to Preparatory Committee; and National Jurisdiction--Developing Trends.
[152 footnotes] FTP

9.3 ARTIFICIAL ISLANDS AND INSTALLATIONS
IN INTERNATIONAL LAW

Soons, Alfred H. A. (University of Utrecht, The Netherlands)
Occasional Paper No. 22, Law of the Sea Institute, University of Rhode Island, Kingston, R.I. (July 1974), 30 pp.

Some of the international legal aspects involved in the construction and operation of offshore facilities are discussed, and some suggestions as to their future regulation are made. The scope of the paper is limited in that (1) it deals only with structures which are permanently above sea level and (2) it does not deal with floating structures. The first international legal aspects considered was the permissibility of the construction of artificial islands and installations. The next question examined was whether the construction of artificial islands and installations has any consequences for the legal regime of the waters surrounding them. Next, the possible effects of their presence on the delimitation of the territorial sea was discussed. Finally, the exercise of jurisdiction to regulate activities on artificial islands and installations was discussed. The author formulated his conclusions in the form of draft articles which could be considered in a comprehensive treaty on the law of the sea.
[76 notes, annex] FTP

9.2 THE MARKETABILITY OF SQUID

Kalikstein, Paul H.
Report No. MITSG 74-24, M.I.T. Sea Grant Program, Massachusetts Institute of Technology, Cambridge, MA 02139 (May 20, 1974), iv + 108 pp.

Although squid is eaten in many parts of the world, it has comparative little acceptance in the United States. During the course of this program of study on squid, three processed squid products were developed: a squid chowder, a squid cocktail, and fried squid rings. This present report presents the results of a market research study to determine the acceptability of squid and squid products. The market study was limited to the Boston metropolitan area--a region of relatively high acceptance of fishery products in general.

A taste panel test showed that the three squid products have the potential of attaining a high level of repeat purchase. Nevertheless, results of a telephone survey and a mail questionnaire indicated that potential trial purchase would be extremely low. In a situation of high potential repeat purchase and a low potential trial purchase, marketers adopt a strategy of extensive promotion. However, because of the nature of the seafood industry--many small and fragmented processors--the author felt that a squid product, even if introduced, would command little promotional support. Furthermore, he believed that an extensive advertising campaign might not be successful. Advertising is effective in stimulating awareness in the population, but only very effective and large amounts of advertising can change the attitudes of a population. He concludes that a potential market in the United States for a processed squid product is too small to warrant introduction. However, the possibility of exporting squid to high consumption areas arises as a feasible possibility. FTP

9.2 PRICE SPREADS AND COST ANALYSES FOR FINFISH AND SHELLFISH PRODUCTS AT DIFFERENT MARKETING LEVELS

Penn, Erwin S. (Economic Research Div., National Marine Fisheries Service, NOAA, Washington, DC 20235)
NOAA Technical Report NMFS SSRF-676, National Marine Fisheries Service (Mar. 1974), vi + 74 pp. For sale by the U.S. Government Printing Office. A single copy may be obtained from D83, Technical Information Div., Environmental Science Information Center, NOAA, Washington, DC 20235.

The rapid increase of fish prices has recently caused public concern. To find the cause of the difference between the price the fisherman receives for his product and the ultimate price paid by the consumer, the author analyzed the distribution of the consumer's dollar paid to the retailer as well as to the wholesaler, processor, and fisherman.

Seven finfish, two canned fish, and four shellfish products were selected for this study. The difference or margin between selling and purchasing prices of each level, the share of the consumer's dollar by each level, and each cost component are calculated for each fish product. The author also analyzed the costs and profits incurred by each marketing function with a description of the major influence on margin differences.

The objective of the study is to give individual firms in the fishery a systematic guide to examine their margins, costs, and profits for each fish product; compare them with the data presented in this study, as national averages for the same product; and determine whether there is room for improvement for their performance and services.
[15 figures, 12 tables, 13 references; appendix with 12 figures and 41 tables]
Extracted from author's abstract

9.3 (9.2) A MULTI-DISCIPLINARY ANALYSIS OF THE VARIOUS PROPOSALS PRESENTED FOR THE 1974 LAW OF THE SEA CONFERENCE ON EXCLUSIVE FISHERIES ZONES

Mallon, Lawrence G.
Sea Grant Technical Bulletin No. 28, University of Miami Sea Grant Program, Coral Gables, Fla. (1974), iii + 81 pp.

International sea law in relation to the trend toward unilateral extension of state jurisdiction and competency over exclusive fishery zones, for purposes of exploitation and conservation, is discussed in this article. The various proposals for extension of jurisdiction for the 1974 Law of the Sea Conference, and the claims of the coastal states with regard to the proposals, are also examined. The author suggests that the proposed system of exclusive fisheries zone has economic merit provided rights to biological and mineral sources of wealth are negotiable. In addition, early unilateral regulation of fisheries by the coastal states is necessary for conservation. The author predicts: that the exclusive fisheries zone proposal will be generally adopted by coastal states in the near future; that it will revolutionize fishery exploitation and conservation; and that it will cause codification and make uniform the many types and degrees of claims made by coastal states. Furthermore, the author suggests that the exclusive fisheries zone, if it provides the basis for obtaining the optimal utilization of resources, eliminates wasteful competition between nations, and provides revenues to the coastal states, could be economically beneficial in the long run. SW

9.3 (9.6) PROCEEDINGS PACEM IN MARIBUS CONVOCATION MALTA, 23-26 JUNE 1973

Krieger, David (editor)
International Ocean Institute, Royal University of Malta Press, Malta (1974), xxi + 382 pp.

Pacem in Maribus IV consisted of a convocation of 150 participants and observers, from over 40 nations and a variety of disciplines, who discussed creative and workable solutions to the problems of a new law of the sea. The meeting was held in Malta, June 23-26, 1973. The discussions were preliminary to the Third United Nations Law of the Sea Conference in 1974, and the principal theme was the need for accommodation of the disparate national positions on major law of the sea issues without sacrificing the common heritage principle.

In addition to the inaugural session, there were four major panel discussions at the convocation. The first discussion was on the Mediterranean Sea and concerned pollution legislation and improving the fisheries. The second panel discussion was on the regional ocean problems in the Caribbean Sea. The third panel discussion subject was the legal and institutional problems of the U.N. Law of the Sea Conference held in 1974. The final panel discussion was on energy relative to the oceans.

In the concluding section, recommendations from these proceedings to the United Nations Committee on the Peaceful Uses of the Sea-Bed were made. The appendices include a list of participants, and a list of Caribbean preparatory papers. SW

9.3 SPECIAL LAW OF THE SEA ISSUE

[Authors and titles listed below]
Marine Technology Society Journal 8, No. 6, 3-66 (July 1974)

To provide some insight as to what is going on relative to the development of rules for ocean use and the Third United Nations Law of the Sea Conference, this issue of the journal is devoted to an examination of law of the sea issues. Besides the introduction, there are seven papers as follows:

"The Law of the Sea Battle -- An Overview," by Earl V. Anderson [Chemical and Engineering News, American Chemical Society, Washington, D.C.], pp. 4-14. The major issues considered at the Law of the Sea Conference [Caracas, Venezuela, 1974] are discussed.

"The Clash of U.S. Interests: How U.S. Policy Evolved," by Ann L. Hollick [Johns Hopkins University School of Advanced International Studies, Baltimore, Md.], pp. 15-28. The success or failure of the Third Law of the Sea Conference will not be measured by a treaty adopted by a majority over the strong opposition of the few, but rather in the creation of institutional mechanisms, whether by a single comprehensive treaty or otherwise, that will be able to keep pace with technology-induced changes in the configuration of world politics. Within this changing environment, the author indicates, viable ocean institutions will need to accommodate the interests of diverse ocean users. [48 footnotes]

"National Interests vs. International Needs," by Seyom Brown, and Larry L. Fabian [Brookings Institution, Washington, D.C.], pp. 29-39. The main questions for ocean diplomacy no longer revolve around how to preserve freedom of the seas, but rather the larger task now facing the international community is to find ways

9.7 REPORT ON THE FAO/MARMAP INTERNATIONAL TRAINING COURSE ON FISH EGG AND LARVAL STUDIES, LA JOLLA, CALIFORNIA, 2-29 SEPTEMBER 1973

Anonymous
FAO Fisheries Report No. 144, Food and Agriculture Organization of the United Nations, Rome, Italy (1974), 18 pp. (Distribution restricted)

The training course was jointly organized by FAO and MARMAP groups of the National Marine Fisheries Service, with the collaboration of UNESCO. Ichthyoplankton research has contributed to: clarification of the life history of commercially important fish, exploration of fishery resources, a better understanding of fish behavior, and the study of fish population dynamics.

The objectives of fish egg and larval surveys were emphasized in the training program discussions relative to other methods for resources estimations. Twenty participants were in the training program; they came from the following countries: Chile (3), Colombia (1), Finland (1), Indonesia (1), Italy (1), Japan (1), Mexico (3), Panama (1), Peru (1), Spain (1), Thailand (1), and the United States (5). The training took place over a 4-week period. The participants engaged in practical work in the laboratory and received lectures on the various subjects. The participants also received training at sea on quantitative ichthyoplankton sampling on board the research vessel David Starr Jordan. There were two main sections in the training program: ichthyoplankton studies for resources evaluation purposes, and identification of early life stages of commercially important fish.

9.7 PARADIGMS AND COMMUNICATION

Maruyama, Magoroh (Portland State University, Portland, Oreg.)
Technological Forecasting and Social Change 6, No. 1, 3-32 (1974) [Elsevier Publishing Co., Inc., 52 Vanderbilt Ave., New York, NY 10017]

Difficulties in cross-disciplinary, cross-professional, and cross-cultured communication lie not so much in the fact that communicating parties use different vacabularies or languages to discuss the same thing, but rather in the fact that they use different structures of reasoning. If communicating parties are not aware that they are using different structures of reasoning but recognize their communication difficulties only, each party then tends to view the communication difficulties as due to the other party's illogicality, lack of intelligence, or possible deceptiveness or insincerity. On the other hand, each party may fall into an illusion of understanding but still be unaware of his misunderstandings. Or, the communicating parties may fall into a collective illusion of mutual understanding.

Different structures of reasoning that exist in different cultures, professions, and disciplines are termed "models" (systems engineers and operational researchers), "logics" (philosophers and logicians), "cognitive structure" (anthropologists and psycholinguists), and "epistemology" (sociologists). In this paper, the author called them "paradigms." He defines "paradigmatology" as a science of structures of reasoning which vary from discipline to discipline, from profession to profession, from culture to culture, and sometimes from individual to individual.

9.8 ECOLOGY AND NATURAL HISTORY OF A STAND OF GIANT KELP, MACROCYSTIS PYRIFERA, OFF DEL MAR, CALIFORNIA

Rosenthal, Richard J. (Scripps Institution of Oceanography, University of California at San Diego, La Jolla, CA 92037), William D. Clarke, and Paul K. Dayton
Fishery Bulletin 72, No. 3, 670-684 (July 1974)

The assemblage of plants and animals living within a stand of Macrocystis pyrifera off the coast of southern California was studied from July 1967 through February 1973. Macrocystis is a perennial kelp, with some individuals living as long as 7 yr; however, the average life span in this bed was approximately 3 to 4 yr. Physical disturbances associated with storms were the major mortality causes of adult Macrocystis in this area. Once detached, these plants drift through the bed and become entangled with other plants which results in extensive mortality. The fact that germination was greatest after the surface canopy was thinned by natural attrition and commercial harvesting suggests that light is a critical factor influencing the recruitment of Macrocystis. There was little indication to show that sea urchin grazing contributed to kelp mortality.

Faunal species identified included 38 fish species and 98 invertebrate species. Of these, 14 species of macroinvertebrates were chosen for more intensive study as they represented common or characteristic species in the kelp bed. Patterns of distribution and abundance were recorded during the study period. Most species had aggregated distribution patterns and the populations of most remained

9.7

On the basis of the experience gained during the training program the document "Fish Egg and Larval Surveys" (FAO Fish. Tech. Pap. No. 122), used as training material, will be revised and issued in the FAO Manuals in Fishery Science series during 1974.

This report gives the conduct of the course and a summary of lectures and discussions. In addition, a list of participants and training staff is given with a day-to-day program, the facilities available, materials given to each trainee, excursions and other activities and examples of illustrated material for practical work on identification. SW

9.3

of limiting free use of the ocean and national sovereignty over some of its parts. The conclusions of the international community that the ocean has become a shared and finite world resource would thus be taken into account. [3 footnotes]

"Who's Who at the Third Law of the Sea Conference," by Judy Joye, pp. 40-44. "The Oil Industry Goes to Sea," by Maxwell S. McKnight [National Petroleum Council], pp. 45-55. The interests of the petroleum industry in the Law of the Sea issues are discussed.

"A Look at Fisheries Issues," by Francis T. Christy, Jr. [Resources for the Future, Inc., Washington, D.C.], pp. 56-59. Society is facing a period of transition, during which time the principle of freedom of the sea for fishing will be dismantled and replaced by imposition of national authority--an authority that might be exercised either unilaterally by a single state or jointly by a group of states.

"Law of the Sea at the End of the Decade--A Prediction," by Lewis A. Alexander [University of Rhode Island, Kingston, R.I.], pp. 60-65. By the year 1980, the traditional freedom of the seas concept will be ended, at least for about 40 percent of the ocean that is marginal to the land. It is hoped for that time, governments will have realized that the chaos of a partitioned and unregulated ocean is even less desirable than was the free seas doctrine, and will begin seriously to work out arrangements for an orderly development of the law of the sea within the context of its new patterns of national jurisdiction. [9 footnotes]

FTP

9.4 REPORT OF THE NATIONAL MARINE FISHERIES SERVICE FOR THE CALENDAR YEAR 1973

Anonymous
National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Dept. of Commerce, Washington, DC 20230 (July 1974), 96 pp.

The report describes the structure of the National Marine Fisheries Service, documents the progress of the organization toward achieving its goals of fisheries research, utilization and management in the national interest, and lists the publications of the organization's staff during 1973. This report is prepared and submitted in response to the requirement of Section 9(a) of the Fish and Wildlife Act of 1956, as amended 16 U.S.C. 742h(a). A list of 14 series of publications issued directly under the auspices of the NMFS in 1973 is included, and an alphabetical listing by authors of 485 publications concludes the report. FTP

9.8

reasonably constant over 4.25 yr. Styela montereyensis (ascidian) fluctuated annually and the Muricea californica (octocoral) population slowly decreased during this time. Conversely, Diopatra ornata (polychaete) displayed a numerical increase, such that in August 1972 it was the most abundant macroinvertebrate in the Del Mar kelp bed. A qualitative food web is presented based on limited trophic information. [9 figures, 5 tables, 32 references] Authors' abstract

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9.6 TROPICAL MARINE INVERTEBRATES OF SOUTHERN FLORIDA AND THE
(1.99)(9.12) BAHAMA ISLANDS

Zeiller, Warren (Miami Seaquarium, Miami, Fla.)
Wiley-Interscience, John Wiley & Sons, 605 Third Ave., New York, NY 10016 (1974), ix + 132 pp. $19.95

This is a visual guide to the tropical marine invertebrates in the southern Florida-Bahamian regions. It contains 248 full-color photographs of living specimens actually collected and nurtured in the regions. Each photograph has captions giving the common name, scientific name, and etymology of the species of invertebrate, and includes a brief description of the animal's habitat and life style. Also, the phyletic lineage from phylum through family is given. Six invertebrate phyla are included: Coelenterata, Platyhelminthes, Mollusca, Annelida, Arthropoda, and Echinodermata. Some of the species depicted may also be found as far north as Cape Cod and south to the West Indies and Gulf of Mexico to Brazil. FTP

[39 references]

9.7

In this paper, the author proposed the exploration of paradigmatology and its application to cross-disciplinary, cross-professional, cross-cultural communication, particularly relative to urban planning, environmental design, and other types of public works. He discusses three paradigms as examples: (1) unidirectional causal paradigm, (2) random process paradigm, and (3) mutual causal paradigm. Next he discusses the existence of literature on the paradigmatic aspects of cross-cultural communication, and the theoretical and conceptual tools available for the identification and analysis of misunderstandings in cross-paradigmatic communication. Finally, he discusses the transparadigmatic process as the process to create not-yet-existing paradigms.
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2.3 DISINFECTION AND CONSERVATION OF DRINKING WATER ON SEA VESSELS

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2.43 (3.2382) EFFECT OF SOME VARIABLES ON THE MIGRATION OF ADDITIVES FROM PLASTICS INTO EDIBLE FATS

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